McGraw-Hill Publishing Company, Inc. February 27, 1926 Twenty Cents per Copy

ELECTRIC RAILWAY JOURNAL

UNITED STATES TIRES ARE GOOD TIRES

U. OF ILL. FEB 25 1941 PER DUPS. COPIES

The Tire that is Really Equal to the New Demands of the Modern Motorcoach

THE U. S. Royal Cord Motorcoach tire has been built *definitely* for motorcoach service. To make this clear the word "Motorcoach" has been placed on the sidewall.

Every detail of its construction has been designed to stand the rigors of the most severe strains, the heaviest loads and the most unfavorable roads.

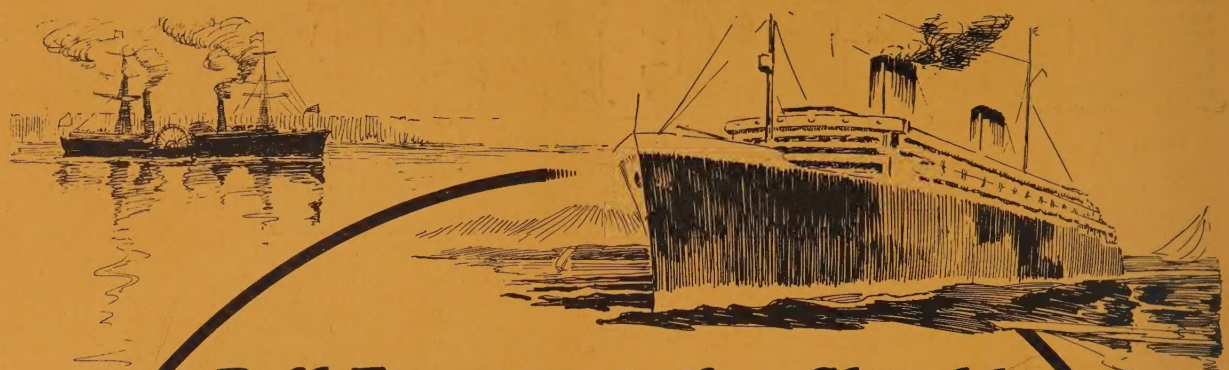
U. S. Tire engineers have studied the tire requirements of the motorcoach from the beginning of bus transportation. They designed the first pneumatic bus tire and were responsible for many of the greatest advancements in this type of tire.

To aid them in accurately determining the actual needs of motorcoach operation, the United States Rubber Company maintained corps of trained tire experts in every part of the country to make a day-to-day study of operating conditions.

Sprayed Rubber tread, *Latex-Treated Web Cord* carcass and broad, flat tread profile insure the lowest possible cost per tire mile.

United States US Rubber Company
Trade Mark

UNITED STATES
ROYAL CORD
Motorcoach



Rail Transportation Should Be Up to Modern Standards

Where there is a determination there is a way to retire obsolete cars

Since Fulton, in 1807, built his steamboat "Clermont" the development in the marine field has been rapid. First ships with one propeller, driven by reciprocating steam engines, then turbine driven ships with three propellers and now Diesel-electric driven motor ships. Throughout this development it has been necessary to rapidly replace the obsolete with the new.

And, as in the marine field,—

so with the electric car, since first operated forty-one years ago, the development has been tremendous until today electric traction is recognized as the most economical method of mass transportation.

But to retain this prestige—

it is essential to replace obsolete rolling stock with modern light-weight cars.

Many railway companies have consistently adhered to this policy. In referring to the 28,000 obsolete street cars now in service J. N. SHANNAHAN, past president of the American Electric Railway Association, has said "I would relegate to the scrap pile the old, heavy and obsolete cars, replacing them with new, brighter and lighter cars. Of our immediate needs, possibly none is greater than that of improved service, through the installation of new equipment".

How many of the 28,000 obsolete cars have you?

Modern street cars attract patronage.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania

Sales Offices in All Principal Cities of the United States and Foreign Countries

MEMBER AMERICAN ELECTRIC RAILWAY ASSOCIATION AERA 1926

WESTINGHOUSE ELECTRIC

Westinghouse

X87238

Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

Published by McGraw-Hill Publishing Company, Inc.

CHARLES GORDON, *Editor*

Volume 67 New York, Saturday, February 27, 1926 *Number* 9

Speeding Up Railway Operation Helps Local Merchants

ELIMINATION of automobile parking in congested districts will aid retail business rather than injure it. That is an old story to the experienced transportation men of the electric railway industry, but the local merchants usually refuse to believe it. Without taking the trouble to analyze the situation carefully, the average storekeeper jumps to the conclusion that his trade will suffer if customers are not allowed to park their automobiles in front of his door. That the users of public transportation vehicles outnumber the users of private vehicles in the ratio of three or four to one is overlooked.

In Pittsburgh, however, the experiment of prohibiting all parking on certain downtown streets was made in the early part of last year and the results have demonstrated that the apprehension of the merchants was groundless. Checks made by the research department of the Pittsburgh Railways show that there has been a substantial reduction in the running time of street cars since the new parking restrictions have been in effect. Detailed figures are published elsewhere in this issue. It is even more interesting to note that the downtown retail trade has prospered more than that in the outlying sections since the change was made. Industrial depression which prevailed during 1925 resulted in a slight decrease in trade throughout the Pittsburgh district. In the downtown section, however, the effect was less noticeable than in the district as a whole, the volume of business being only 0.8 per cent lower than in 1924, whereas for the entire area the decrease was nearly 3 per cent.

The conclusion seems fairly obvious that the downtown merchants prospered by the enactment of traffic regulations that made it easier for the majority of people to reach their stores. This result is probably no different from that which has followed the establishment of similar regulations in other cities, but Pittsburgh is particularly fortunate in being able to establish the fact by such convincing figures.

New Cars Are Desirable Because They Will Earn More

REPLACEMENT of 28,000 electric railway cars has seemed to some persons such a radical proposal that in certain quarters it has been questioned. "We cannot throw away more than a third of the rolling stock of the industry," say these managers. "How can we finance the purchase of new cars for the purpose when money is not to be had for much-needed extensions?"

Such an attitude naturally does not take into account the real purpose of the plan for using new cars instead of old. No one contends for a moment that these cars can or should be replaced all at once. It will tax to capacity all the car building plants in the country for several years to carry through such a program, to say nothing of the new cars which are needed for extensions of service.

The real point is that new cars are urged because they will earn their keep. Cars twenty years or more old were built prior to the development of modern equipment and devices, and before steel was used to any considerable extent in framing. Nearly all such cars are heavy for their carrying capacity. Platforms, doors, aisles and step heights were not designed to get riders in and out quickly or efficiently. Provisions for fare collection are inadequate. The trucks and motors are relatively inefficient. Then, too, with twenty years or more to their credit they are not able to give the quality of service they once could, nor to operate at the same cost for maintenance.

It can be shown easily that new cars are an economy. Mr. Storrs has done that in several addresses. Mr. Budd in his Indianapolis paper before the Central Electric Railway Association not only gave a few examples of what new cars have done, but he listed a dozen roads that have increased their revenue, both gross and net, in the past five years. A factor of no inconsiderable importance in each case was the substitution of new cars for old. What does the cost of new cars matter if the net revenue can be increased materially due to their use?

Merger of Electric Railway and Bus Manufacturers Should Speed Co-ordination

TRANSPORTATION men should view with favorable interest the recent consolidation of the American Car & Foundry, Brill and Fageol interests. Here large builders of steam railroad and electric railway cars have added to their interests a going bus manufacturing business of considerable size and importance. The new company now stands in the unusual position of being prepared to sell transportation vehicles of practically every type now seriously considered. The principal men in the new company have wide experience in their respective fields. By combining their knowledge and financial resources as they have, the way is opened for constructive thinking of the kind that should prove helpful to the industry at this time.

Never before in the history of the transportation industry has there been more need for care in the selection of the type of vehicle to be used, particularly in local systems. While engineers may estimate the results to be anticipated with this or that method, it remains for the builder to produce the vehicle which will carry out the proposal. It has been seen repeatedly that such elements as vehicle weights and operating speeds spell the difference between success and failure. The manufacturers' engineering committee, recently formed

under the auspices of the American Electric Railway Association by car builders and equipment men, can do much in pointing out these things. But the result must necessarily lie with the company that actually builds the equipment.

Consideration of the bus in connection with many of the problems of local transportation makes it essential that its use be given careful study and fair and unbiased treatment. For the first time a manufacturer is in the position to build either cars or buses as desired. This gives it the opportunity to study in a practical and unbiased way the advantages and the limitations of each method of transportation under different operating conditions. This it can do if it will reveal its findings without fear or prejudice. By grasping its opportunities it is in an enviable position to aid the movement for co-ordination and modernization of transportation methods. Through the wide and diversified experience of its personnel, it can give a greater measure of constructive help than was possible when the companies were divided and operated individually.

Skillful Public Relations Work Made Part of a Rehabilitation Program

METHODS by which transportation revenue has been increased 65 per cent in three years on the Chicago, Aurora & Elgin Railroad are told of elsewhere in this issue in the first of several articles describing the rehabilitation of the property. Many factors have contributed to the development. The territory is a highly competitive field in which four steam railroads operate suburban service in addition to that provided by the electric line. It has been necessary, therefore, to use every available means of building up the traffic.

Of greatest importance in the success which has attended the efforts of the company has been the really high-class service rendered by the Aurora-Elgin line. Many new and modern cars have been bought. Track has been thoroughly rehabilitated, using stone ballast in place of gravel. Old stations have been spruced up and attractive new stations built. Power facilities have been improved. Signals and additional crossing protection devices have been installed.

Besides the great improvement which has been made in the physical plant, skillful work has been done in fostering good public relations. Among the interesting steps taken in this direction might be mentioned the issue of special low-rate homeseekers' tickets. These have been used to encourage residents of Chicago to go out into the Aurora-Elgin territory to examine its possibilities as sites for future homes. Many people whose first knowledge of this electric railway was acquired in this manner have now become regular patrons.

Commutation tickets have furnished another means of cultivating public relations. Whenever a new name appears on the list of buyers of monthly tickets, the management sends a special message of greeting expressing the hope that the new ticket buyer will find the service satisfactory and requesting his co-operation in finding ways to improve it. In case an old name disappears from the list of commutation ticket buyers a representative of the management calls to find out why the former user has dropped out. In this way many minor shortcomings of the service have been discovered, and by the exercise of tact and diplomacy former customers have been won back to the railway. The possibility of copying these particular methods does not exist on every railway, but alertness to take advantage of the opportunities that do exist, however, will usually do much to improve public relations and build up traffic.

Boston Figures Deserve Careful Study

LIGHTLY to pass over the record of the Boston Elevated Railway for 1925 as disclosed by the digest of the annual report in the issue of the JOURNAL for Feb. 13 would be a mistake for others engaged in the work of the industry. That report as presented by the public trustees to the state reflects not only the record of the road itself, but it contains in its statisics many unit figures that are of immeasurable value for comparative purposes. Of the value of these to him each reader must judge for himself. Aside from all this, however, there are certain points which should perhaps be emphasized.

Of particular interest is the attitude of the company on the matter of buses. The management is ready to furnish bus service wherever it appears desirable to do so. It might at first be thought that this was only a generality, but that is not so when the record of increase from 63,937 bus passengers in 1922 to 2,472,456 passengers in 1925 is considered. The chartered bus is also becoming a factor at Boston. Of interest, too, is the plan made for parking automobiles outside of congested centers and inducing their users to journey into the city on the car lines. Particularly proud are the trustees of the record that shows that only 12.7 per cent of the passenger cars now in service on their lines are more than twenty years old compared with the fact that of the 82,340 cars in the United States in similar service 34 per cent are of greater age. The accident record also reflected the intensive work that is being done to decrease the hazard to the passenger.

One of the saving features at Boston is that a broad discretion is vested in the trustees to change the rates of fare when necessary, but their acts are subject at all times to the principle of service at cost. True, $2,327,816 is due to the cities under the provisions of the public control act that if in any year the established rates of fare do not meet the cost of service and the reserve fund of $1,000,000 is used up, then any loss above that amount will be paid over by the state to the trustees. Any such amount paid by the state is assessed upon the cities and towns in which the lines are operated in proportion to the number of persons in such cities and towns using the service at the time the payments are made by the state. If, in later years, receipts exceed the cost of service, any amount in the reserve fund in excess of the $1,000,000 with which it was started is paid over by the state to be repaid to the cities and towns until any assessments have been repaid. Thereafter, any such excess remains in the reserve fund until needed to meet the cost of service. Fares are then to be reduced as described above.

These are terms that have been stated many times before. Sight should not be lost of them in any study which is made of the mass of data contained in the report of the trustees as presented to the Legislature.

Under the conditions that prevail at Boston it was no ordinary performance on the part of the management that resulted in the showing of $502,195 in 1925 as the balance of receipts above the cost of service compared with a deficit of $636,696 for 1924. In fact, the more one studies all the circumstances the more is the truth borne home that the residents of Boston are the real subjects for congratulation.

Staggered Hours Again Proposed to Relieve New York Transit Situation

RELIEF from the almost intolerable conditions on the rapid transit lines of New York is proposed by the Health Commissioner and the head of the Transit Commission through the adoption of the staggering of working hours. The plan was proposed in Washington and in New York during the war, and was actually put in practice for a short period in each city. Its use was abandoned, largely because the workers had not accustomed themselves to the adjustments necessary in their daily routine. In Washington it is said that the difficulty of obtaining negro maids who would prepare breakfast at several different periods had much to do with the disfavor into which the plan fell.

Outside of the transportation industry, it is not generally realized that peak-load conditions have become much worse during the past few years. Evidence to this effect is readily available, however. Study of the load curves of a number of the large electric generating stations illustrates in a striking way the change that has taken place. Between 1920 and 1925 there has been a marked improvement in the load factors of stations which supply no railway power, while in the case of generating stations serving the electric railways the load factor has become worse during this period.

Undoubtedly the present situation is a serious one. Congestion in the streets, overcrowding of transportation vehicles, excessive investment cost for equipment needed only in rush hours and uneconomic use of power station facilities all indicate the imperative need for some form of relief. Staggered working hours will afford a measure of such relief if the public is willing to accept this solution of the problem.

Reduction in Hours of Labor Has Increased Rush-Hour Congestion

ACCENTUATION of the sharpness of the rush-hour peak demands on the urban transportation systems is due in a considerable part to reduction in the hours of labor. The time for starting work has been set later, so that the executives, clerks and laborers begin and end their business day more nearly at the same time. This has meant that to carry the people on the transportation systems additional equipment has had to be put in service as far as possible. Beyond that, overcrowding has been the only way out.

Shifting of the hours of work slightly will make it possible for the transportation companies to give better service than under present conditions. If the spread of working hours is over only a limited period, the plan will tend to increase rather than to decrease the cost of rush-hour service, as the maximum loads per vehicle will be reduced. Real relief can be obtained if the hours can be spread sufficiently so that the cars and trains can make more than a single round trip during the rush hour, which is all the most of them can make under present conditions. In case enough spread in the peak can be obtained so that two or more trips can be made it will mean that much better service can be provided at a cost no greater than the present. It will mean that construction of rapid transit lines, now sadly behind due to the policies of ex-Mayor Hylan, will be given a chance to catch up with the growth in population.

The same plan can be used to advantage in any city where there are sharp rush-hour peaks. As a means of getting more transportation it has such merit that, barring the construction of new lines, it warrants serious consideration.

Detroit Will Pay for Its Cars Out of Earnings

INTEREST in the suggestion of H. U. Wallace, general manager of the municipal railway at Detroit, Mich., to acquire 300 more new cars and 150 new buses goes beyond the proposal itself. True, that suggestion reflects the growth of the demand for transportation, but it is his remarks about the inadvisability of keeping old cars in service that show the modern trend in selling transportation. The information available does not indicate the age of the equipment which Mr. Wallace would replace. It would be interesting to know that. Of greater significance is the fact that the department at Detroit has been assured it will be able to secure new cars and buses, on terms that will permit it to pay for all of the cars out of earnings or out of the savings that the department will be able to make in the cost of operating the new, light, modern rolling stock as compared with the present heavy and obsolete units.

Mr. Wallace is not given to making rash statements or to holding out promises that are not likely to be fulfilled. His task at Detroit is a difficult one. He knows that. If other evidence of his ability correctly to diagnose the needs of Detroit were needed it is furnished in the paper presented by him before the Highway Engineering Congress at Ann Arbor on Feb. 17, a digest of which is published elsewhere in this issue. That shows his grasp of the general situation. More recently, however, he went on record with respect to the need for up-to-date rolling stock before the North End Business Men's Association. He knows what the public wants. As the disposition of the Board of Street Railway Commissioners is favorable to his proposal the riders of Detroit will probably get what they want. Not only that, they will apparently get it on terms and conditions that should appeal to the railways elsewhere confronted with similar problems of providing adequate rolling stock, some of which have heretofore been loath to believe that the plan which he has in mind was workable.

The Detroit proposal is, of course, not new. Its sponsors would not claim credit for that. But the credit is theirs of putting the matter before the public in its present light and of being prepared to subject the matter to the acid test of daily experience. The equipment trust obligation, in which the cost of new equipment is amortized over the years out of earnings, is an old device, but resort to it has been all too infrequent in the electric railway field.

Depreciation as an Operating Expense

FIRST ARTICLE

Definition of the Problem—Service Life Is Difficult to Determine, and on This the Whole Structure Rests—Illustrations Given to Show Several Viewpoints—Creation of a Depreciation Reserve Is Vitally Important

By W. H. Maltbie
Late General Counsel United Railways & Electric Company of Baltimore

SOME months ago, as the result of a conversation with one of the editors of this paper, the author undertook to prepare a series of articles on the subject of depreciation. This series was looked forward to with great interest, as Mr. Maltbie was an outstanding authority on the subjects of valuation and depreciation. After his death, the manuscript was located and forwarded to this paper through the kindness of J. H. Hanna, chairman of the A.E.R.A. committee on national relations sub-committee on depreciation, of which Mr. Maltbie was a member.

These articles were written from the viewpoint of the present investigation by the Interstate Commerce Commission of the whole subject of depreciation of electric railway property. This investigation was undertaken with a view to establishing definite rules and regulations covering the allowance of charges for depreciation as an operating expense on all roads subject to its jurisdiction. Since there is a possibility that any regulations of this sort established by the I. C. C. may be accepted as a precedent by various state commissions it is important that all street railway executives should be familiar with the present situation.

These three articles, dealing respectively with causes of depreciation, methods of setting up funds to provide for depreciation and practical methods of building up a retirement reserve, constitute a valuable contribution to the literature on the subject. They were probably the last creative work of the author.—EDITOR.

THE interstate commerce act, as amended Feb. 28, 1920, contains in Sec. 20, paragraph 5, a direction to the Interstate Commerce Commission to determine for all carriers subject to the act the classes of property for which depreciation charges might properly be included under operating expenses and the percentages of depreciation that should be charged with respect to each such class of property with power to the commission to classify carriers for this purpose and thereafter, if necessary, to modify these items. The act further provides that carriers subject to the act shall not charge to operating expenses depreciation on any classes of property except those included by the commission or charge for any class of property a percentage of depreciation other than that prescribed by the commission.

There is some dispute as to the real intent of this section of the law. Some hold that Congress was fearful lest certain railroads should use their previous freedom as to the setting up of depreciation reserves as a means of absorbing income which would otherwise be subject to recapture, and passed the section in question solely with a view of preventing overcharges for depreciation. Under this interpretation of the act the charging of depreciation upon any particular class of property is optional with the company, but if charged it can be only upon those classes of property which the commission has selected, and at the rate which the commission has fixed.

Others hold that it is the intent of the act that the Interstate Commerce Commission should set up classes of depreciable property and fix percentages for each class, and that thereafter carriers subject to the act shall set up depreciation at the fixed percentages upon all property classed as depreciable.

In carrying out the provisions of the act the Interstate Commerce Commission has created a depreciation section in its Bureau of Accounts and instructed this section to make a study of depreciation for each class of carrier subject to the act and prepare a report to the commission which will be made the subject of subsequent testimony, brief and argument.

Reports upon carriers by water, telephone companies and steam railroads have already been prepared and filed by the depreciation section, and the study of electric railway property is now in progress. No decision has been handed down by the Interstate Commerce Commission in any of these cases.

While the depreciation section, of course, is not compelled to follow in its electric railway report the precedents established in its other reports, the reports already published indicate the general point of view of the section.

The American Electric Railway Association has undertaken to give the Interstate Commerce Commission the fullest possible co-operation, and with that end in view has created a sub-committee of the committee on national relations to handle the problem, with J. H. Hanna of the Capital Traction Company, Washington, D. C., as chairman, and on the recommendation of this sub-committee employed the writer as its attorney to study the collected information, prepare the case for the association and submit it to the Interstate Commerce Commission.

DEPRECIATION A TWOFOLD PROBLEM

The problem is so complex and the information already furnished to the commission and the association indicates such a wide divergence of views, and in some cases such a complete misunderstanding of the situation, that it seems wise to accept the invitation of the JOURNAL and attempt to clarify matters by a discussion of the problem now under consideration.

Depreciation is in reality two distinct problems. The

difference between them will perhaps be more clearly understood by considering the executive who has bought a new car and confining our attention for the moment to the single car. It is a reasonably safe bet that at some future date that car will be retired and replaced by a new one. When that time comes the company should have at hand a sum equal to the cost of the retired car, accumulated during the life of the car. A determination of the annual contribution to this retirement fund is therefore nothing more than the simple operation of dividing the cost of the car by the number of years of its service life.

But what is its service life? It may go out at any time through an accident; it may wear out at some future date, which may be almost indefinitely deferred by proper maintenance or hastened by lack of proper care; a change in the art may make it so uneconomical a unit to operate as to force its retirement; it may no longer meet with the approval of public taste; or it may become inadequate on account of its speed or loading limitations and be retired for that reason. No matter how skilled and experienced the executive, his answer to the question is a guess, based upon a consideration of those causes which tend to shorten and those causes which tend to lengthen the useful life of the car in question.

The executive, if he is wise and his revenues will stand the strain, having made his guess as to the service life of his one car, will deliberately shorten it in order to protect himself in case its ultimate retirement comes earlier than he anticipates. Even then, if he is dealing with a single car, he is liable to lose a large part of his investment, since it is impossible to accumulate a reserve with sufficient speed to protect the owner against all possibilities of accidental destruction.

Depreciation Must Be Treated as an Operating Charge

The annual payment into this reserve will be treated as an operating charge, and the problem which the executive has now solved is the problem of depreciation as an operating expense.

Now let us assume that ten years have elapsed and that the executive desires to know the value of the car, which has not yet been retired. His problem is: "How much is the car worth to me; how much will I take for it and purchase a new car?" And the answer to the question is to be found in a comparison of the expected life of the car as it stands with the expected life of a new car replacing it. The original life expectancy was a guess based upon an estimate of the length of life till retirement through accident, the length of life till retirement through obsolescence, the length of life till retirement through wear, and the length of life till retirement through inadequacy. Ten years have elapsed, but withdrawal through accident is no nearer than it was ten years before. If the art has been changing, retirement through obsolescence may be at the very door; if the art has not been changing, it is probable that the life until obsolescence retirement estimated today will be as long as the life estimated ten years before.

The danger from removal through inadequacy may be as indefinite as it was ten years before, may be much greater, or may even be more remote. The amount of remaining wearing life depends on the present condition of the car. It would seem evident, therefore, that the question of the present value of the car cannot be answered merely by a computation based upon the executive's original guess as to service life and the elapsed period of ten years.

A Second Illustration

The distinction will perhaps be clearer if we use more definite quantities in our illustration. Let us assume that the car in question was a double-truck, four-motor equipment with a seating capacity of 40, and that the company operated an interurban line connecting a number of smaller communities with a larger center, but had no urban division. The executive, on the basis of his own experience and such information as he can collect elsewhere, decides that in the long run, so far as mere wear is concerned, cars may, with proper care and maintenance, be kept in active operation for a period of 50 years. Therefore his protection demands an annual appropriation of 2 per cent. He is one of those who believe that the gradual progress of the art will continue and that passenger cars in general will become obsolete after 20 years. Protection from this demands an annual appropriation of 5 per cent. Finally, believing that his central city is about to develop as a manufacturing center to which the smaller communities which he serves will become suburban areas, he reaches the conclusion that within ten years this car will become inadequate and must be replaced either by cars of larger capacity or by multiple-unit trains. He therefore, for this reason, assigns a ten-year life and sets up a reserve of 10 per cent annually.

Since the reserve for inadequacy will provide the entire cost of the car before either obsolescence or use demand its removal, the latter elements are entirely ignored, and the depreciation reserve of 10 per cent set up on account of inadequacy is the sole reserve set up, and the service life is estimated, therefore, at its minimum figure of ten years.

Now that the ten years have elapsed, however, the car would have, if original conditions had continued and the original estimates been correct, no value except scrap or resale. As a matter of fact, however, the executive's expectations as to the development of his central city as a manufacturing area have not been realized. Instead, it has developed as a jobbing and educational center. His 40-seat unit passenger car is as adequate today as when it was first installed, and there is practically no probability that it will ever become inadequate. Moreover, the executive has acquired in the ten-year period an urban division, and therefore if the inadequacy should by any chance occur, he is prepared to shift this car to meet the constantly increasing demand for urban service. It is, therefore, so far as inadequacy is concerned, just exactly as valuable as it was at the beginning of the ten-year period.

So far as obsolescence is concerned he finds that the manufacturer is still building the same car and selling it, and that he himself, if he desired to increase his service with new cars, would probably buy identical equipment with that which he already operates. He still believes that in the long run cars will go out through obsolescence in an average of 20 years, but there is certainly no difference, so far as obsolescence is concerned, between this car and the new cars which are being turned out by the factory, and therefore, if he assumes that this car has lost half of its value because ten years of the assumed 20-year life have elapsed, he is driven to the ridiculous conclusion that

new cars coming from the factory are worth only half what they cost.

So far as wear is concerned, while he anticipated 50 years of usefulness, the car may actually have done better or worse than he anticipated, and the only thing to do is to examine it and determine whether or not it has probably more or less than 40 years of life remaining.

Suppose that on examination he finds that it is wearing about as he expected. He has then a car which will presumably wear for 40 years; is probably good, so far as obsolescence is concerned, for 20 years, and is in no danger of inadequacy. Its probable service life, at the end of the ten years originally estimated, is therefore 20 years, and the car for which a reserve of the full difference between cost and resale value has been accumulated bids fair to render the same service, and therefore to be as valuable, as a new car.

In other words, present-day value is not to be measured by elapsed life, or by the deduction of the existing reserve from the present value. In the words of one of our federal courts, depreciation reserves "represent what observation and experience suggested as likely to happen, . . . with some margin over . . . The law requires deduction only for actual depreciation, just as actual as the present value, and the extent of that depreciation must be ascertained by the same kind of evidence; in the last analysis opinion based on contemporary investigation." U. S. District Court, Southern District, New York, New York Telephone Co. vs. Prendergast. Rate Research Vol. 25, No. 11, page 165.

The pending case before the Interstate Commerce Commission is related entirely to the first of these two depreciation question, namely, how much shall street railway companies set up year by year as a reserve with which to care for the retirement of property?

The answer to this general question involves the answer to several subordinate questions which we will now consider.

What Property Needs a Reserve?

First—For what property shall a reserve be created?

The obvious answer to the question is to create a reserve for all property which must eventually be retired and to make the reserve equal to the difference between the original cost and the value of the property when retired. In other words, there will be no reserve created for land; very nearly 100 per cent reserve for cars which it is expected will be retired through obsolescence or wear, since scrap value is small, and a smaller reserve for a car which it is anticipated will be retired at an early date through inadequacy, since the resale value of such a car may be considerable.

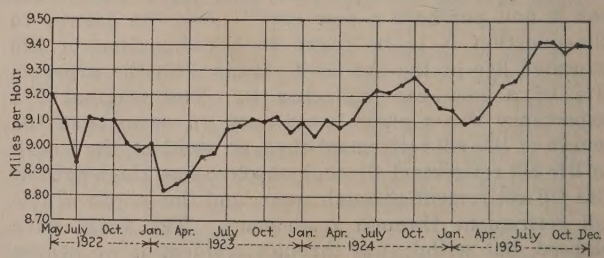
The answer to the question is not, however, so simple as it seems. Consider the trackage of a large steam railroad system. It is obviously impossible to set up a depreciation reserve for each rail or each tie. Rails and ties wear out, however, and are, as they wear, replaced from year to year. But, as a matter of fact, current repairs and current maintenance leave the system, generally speaking, with the same or a greater value at the end of each calendar year than it had at the beginning. It is true that the appropriation might be made to the depreciation reserve year by year, and the amount expended for rails and ties entered as charges against this reserve, but on a large diversified system the annual charges would approximately equal the annual appropriation, and the only practical result of the application of the depreciation theory to this trackage is a complication of the accounting requirements of the company. Considerations such as these have led the Interstate Commerce Commission, in its dealings both with the steam and with the electric lines, to make it optional with the carrier as to whether a depreciation account shall be set up for trackage; have led the depreciation section of the Interstate Commerce Commission, in its recommendations with regard to steam roads, to suggest that no depreciation reserve be set up for rails, ties and track construction, and have led the Treasury Department, through the Income Tax Division, to refuse to make any allowance for depreciation on track structure.

While this ruling is entirely satisfactory to the larger electric railway systems, which, because of their age and large total mileage, do approximately the same amount of track reconstruction work each year, it is not satisfactory to the smaller companies, and particularly to the smaller companies of recent origin. These smaller companies may run for several years without any important reconstruction program, and then be compelled to reconstruct a large percentage of their entire trackage, or, as in a case recently presented to the Income Tax Division, a new road may find itself at the end of its first life cycle compelled to face practically a 100 per cent track reconstruction program.

It is obvious that a heavy burden of this sort cannot be absorbed by operating expenses of a single year, and good business dictates that a company which foresees an expense of this sort shall accumulate out of earnings an adequate reserve.

Operating Speed Increased at Detroit

DURING the year 1925 the Department of Street Railways, City of Detroit, increased the operating speed of its cars from 9.10 m.p.h. in February to a maximum of 9.42 m.p.h. in August and September. During the fall months there was a slight retrogression. The increase in average speed is attributed by H. U. Wallace, general manager, to the electrification of switches, which were formerly manually operated; widening of certain streets and the work of the Mayor's traffic committee, which has brought about many improvements in traffic regulations. Moreover, 90 cars



Operating Speed by Months of the Department of Street Railways, City of Detroit

which formerly used storage air were equipped with compressors. Birney cars, which were formerly operated on some of the principal streets of the city, have been removed and are now used in outlying districts. It is felt by the management that a continuation of the present program will make possible a general average speed of about 10 m.p.h. The operating speed of the Department of Street Railways is shown in an accompanying chart by months from May, 1922, to November, 1925.

Pleasing appearance of passenger stations has helped to build up traffic on the Chicago, Aurora & Elgin Railroad. This shows a Chicago limited train at Wheaton

From Receivership to Prosperity in Three Years

FIRST ARTICLE

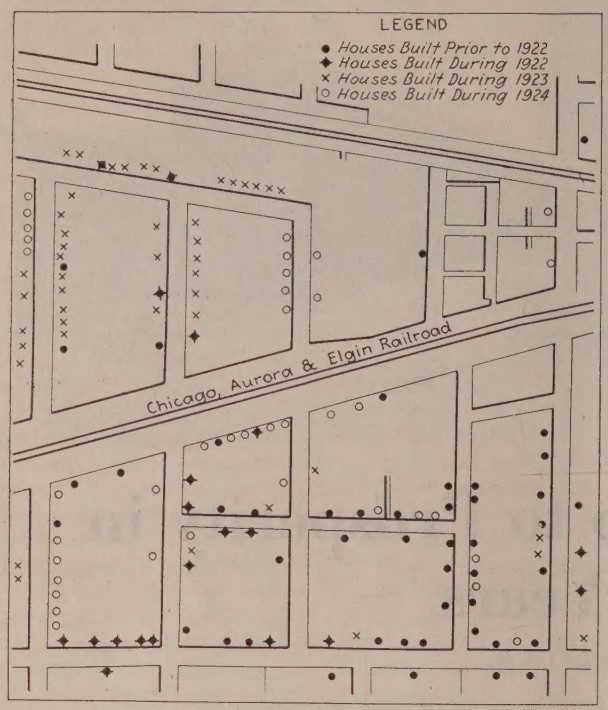
Development of Territory, Reconstruction of Track and Operation of New Cars on the Chicago, Aurora & Elgin Railroad Have Increased Transportation Revenue 65 per Cent in Three Years—Fares Are Higher on Electric Line than on Competing Steam Roads

FROM out the wreck of the receivership of the Aurora, Elgin & Chicago Railroad a new company was born in the summer of 1922 and has forged ahead rapidly since that time. The plan of reorganization was formulated by Dr. Thomas Conway, Jr., who became president of the new company, known as the Chicago, Aurora & Elgin Railroad. While considerable work had been done during the receivership to improve the physical condition of the property, it was far from being up to the standard desired by the new management. An extensive program of rehabilitation was undertaken immediately, including the reballasting of the line from Wheaton to Chicago, a distance of 25 miles; purchase of new passenger and freight equipment, construction of additional substations and improvements to passenger stations along all its lines. The resulting substantial increase in traffic has fully justified the expenditure of $1,500,000 for these improvements. The story of the development of traffic is told in this issue. Details of the track reconstruction, new rolling stock, improvements in power facilities and the development of a profitable freight business will be told in future articles in this paper.

At the time the Conway management assumed control, the property was dependent mainly upon the through business between Chicago and the five terminal cities located in the Fox River Valley, Aurora, Elgin, Batavia, Geneva and St. Charles. No sustained attention had been given to the development of the intermediate territory. The Aurora-Elgin property, as it is called, is faced with competition as keen as any to be found in the United States. The territory through which it runs is served also by the suburban lines of the Chicago & Northwestern, the Chicago, Burlington & Quincy, the Illinois Central and the Chicago, Milwaukee & St. Paul railroads, which render suburban service of the first quality, both as regards comfort and frequency. The traveling public has a free choice of using either steam or electric service, depending upon which seems most attractive. The new management decided that a rehabilitated and modernized electric railway had certain advantages, which if properly exploited would enable it to command a fair share of the competitive business. The plans, however, did not contemplate building up the Aurora-Elgin property solely by taking traffic away from the steam railroads. The objective of the new management was primarily the upbuilding of the territory served, thus creating more traffic and simultaneously increasing the prosperity of the railway and the various communities.

As soon as the work of physical rehabilitation of the property has been sufficiently advanced to constitute a

self-evident demonstration of the good faith of the new management and of its ability to carry out its promises, Dr. Conway called together all the real estate dealers and municipal officials of the several communities served by the railway, to acquaint them at first hand with the plans of the new company and enlist their support in a co-operative effort to build up the territory adjacent to the company's lines. He pointed out that in the decade



Section of Permanent Record Map Showing Houses Built Each Year Since Reorganization of the Railway

which ended in 1920 the population of the city of Chicago had increased 23.6 per cent, while the population of the suburban belt, known as Metropolitan Chicago, increased 76 per cent. The Chicago, Aurora & Elgin Railroad territory did not receive its share of the growth which occurred, because none of these suburban communities on the line showed an increase in population of as much as 76 per cent. Opportunity existed, he said, not only to attract a proportionate share of the future growth of the suburban belt but also to catch up and secure a part of the growth which should have occurred from 1910 to 1920.

Close and cordial relations were established between the management and the real estate interests and municipal officials. For the purpose of assisting in the suburban development, the Chicago, Aurora & Elgin Railroad put into effect a system of homeseekers' tickets, sold in lots of 100 to real estate agents, at rates approximately equal to the 25-ride ticket rate applicable to the same point, which averages between 1.4 cents and 1.5 cents per mile, depending upon the distance from Chicago. In a short time all of the real estate dealers in the territory were purchasing these tickets and distributing them to prospective home buyers to enable them to make inspection of the property which the dealers had to sell.

The railway believed that this ticket would not only assist in attracting people to the territory but it would also introduce them to the Aurora-Elgin service, which, if it proved acceptable, would win the new settler as a regular patron. It soon became apparent from a study of the development of the territory and the traffic of the property that the use of homeseekers' tickets constituted an almost exact index of the rate at which lots and homes were being sold. The accompanying chart shows graphically the collection (not sale) of these tickets by months from July, 1922, to the end of 1925.

From the beginning the company has given the closest attention to the rate of development of its territory, by periodically making a comprehensive and detailed survey of the situation. In July, 1922, a few days after the new management assumed control, instructions were given to the engineering department to make a detailed survey of the entire suburban territory to furnish a basis for future comparisons. The results of a house-to-house field canvass were plotted upon permanent maps, thus furnishing a permanent record of all buildings then constructed within a distance of 1 to 1½ miles on either side of the company's lines, the distance depending upon the degree to which the road might expect to attract traffic in competition with other transportation agencies. A similar field canvass was made in December, 1922. Observers were furnished with photostat copies of the original map showing the results of the July canvass, with instructions to indicate thereon all new houses. Similar checks, the results of which were compiled in like fashion, were made in December, 1923; in December, 1924, and in June and December, 1925. A portion of a typical office map showing all houses constructed in a section of the town of Villa Park from 1922 to 1924 is shown in another column.

Records of this kind have proved useful in estimating growth in traffic, in planning schedules and future cap-

COMPARATIVE INCOME STATEMENT FOR TWELVE-MONTH PERIOD ENDED JUNE 30, 1922, AND FOR CALENDAR YEARS 1922, 1923, 1924 AND 1925, CHICAGO, AURORA & ELGIN RAILROAD

	1925	1924	1923	1922	Twelve Months Ended June 30, 1922	% Inc. 1925 Over 12-Mos. Period Ended June 30, 1922	% Inc. 1925 Over 1924
Gross revenue railway operations	$2,707,616.91	$2,315,638.45	$2,184,121.93	$1,910,472.11	$1,632,815.50	65.8	16.9
Railway operating expenses, including maintenance, rentals and general taxes	2,061,442.35	1,813,374.03	1,722,795.35	1,569,197.24	1,378,859.72	49.5	13.67
Net railway operating revenue	$646,174.56	$502,264.42	$461,326.58	$341,274.87	$253,955.78	154.4	28.6
Net operating revenue from the sale of power (exclusive of power sold to Chicago Suburban Power & Light Company, included above)	.....	1,356.38	94,823.31	107,179.17	113,598.92		
Other income	30,444.57	16,820.42	8,703.76	280.57	127.44		
Total income	$676,619.13	$520,441.22	$564,853.65	$448,734.61	$367,682.14	84.0	30.0
Interest on bonds and other interest and deductions	191,653.06	203,839.21	165,414.02	126,381.75	120,430.44	59.1	
Balance available for depreciation, amortization and surplus	$484,966.07	$416,602.01	$399,439.63	$322,352.86	$247,251.70	96.1	53.1
Appropriation to renewal and replacement reserve	165,000.00	165,000.00	165,000.00	121,924.65	120,764.67		
Balance	$319,966.07	$151,602.01	$234,439.63	$200,428.21	$126,487.03	153.0	111.0

ital requirements, particularly as regards the need for additional substation capacity, rolling stock, shop facilities, etc., in outlining the annual program for crossing protection, in determining what new station facilities are required, in keeping track of the progress of real estate development and in determining whether the company was receiving its proportionate share of the growth of the business in each community.

The tabulation on page 360 shows the tremendous progress which has been made during the last four years in the development of the suburban community between Wheaton and Chicago on the main line of the Chicago, Aurora & Elgin. The per cent increase in the number of houses in each suburban town for each year over the number of houses in existence at the end of the preceding year is given.

Perusal of this tabulation shows that the increase in the number of houses in the various suburban communities from July 1, 1922, to Dec. 31, 1925, has ranged from 53 per cent to 379 per cent. Through the territory as a whole, the average increase in the number of houses within the area tributary to the lines of the Chicago, Aurora & Elgin Railroad over the 3½-year period has been 136 per cent.

In consequence of the close cooperation established between the real estate developers and the management, it has been possible regularly to secure from many of the former the names and addresses of home buyers about to settle in the territory. These prospective customers have been promptly added to the mailing list of the Aurora-Elgin and effective publicity literature has been sent to them. The advantages of the electric service and ticket rates prevailing have been called to the attention of the new residents at or shortly after the time they move into the community.

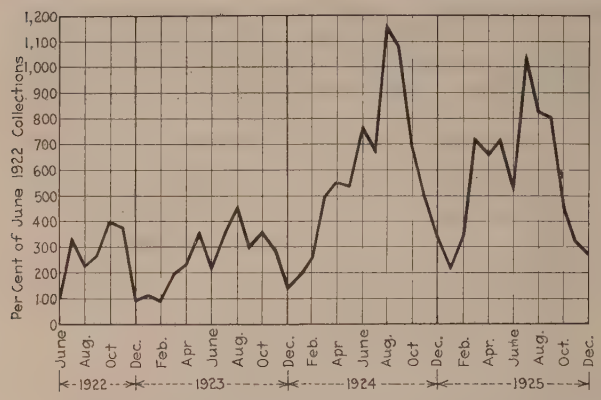
Suburban Territory Served by the Aurora-Elgin Lines. Shaded Areas of Communities Between Wheaton and Chicago Are Developments of Past 3½ Years

All ticket agents are required to report monthly the names of persons who for the first time have appeared on their records as purchasers of commutation tickets. A personal letter is written by J. H. McClure, general manager, to each new commuter, welcoming him as a patron of the company, expressing the hope that he will find the service satisfactory and that if he has any complaints or suggestions to make he will do the company the favor of giving it the benefit of his opinion. This letter also calls attention to the ten and 25-ride tickets sold by the company and their uses and advantages to the other members of the family. It has been found that these letters give a personal touch to the relationship between the management and the new commuters, as evidenced by hundreds of letters written by the recipients of such communications and many valuable suggestions that have been made by them.

Ticket agents of the company are also required to report each month the names of all commuters who purchased tickets in the preceding month, but who do not appear in the records as having purchased monthly tickets for the period in question. A representative of the transportation department is immediately assigned personally to interview these individuals and to report results of this interview to the general manager. Many discourtesies or lapses in service have been brought to the attention of the general manager. In a large majority of these cases, personal interviews resulted in ironing out the irritations of passengers and in winning back the business temporarily lost. The knowledge that every passenger who discontinued the use of the line would be interviewed by a representative of the management and a written report made thereon has had a salutary effect in promoting uniform courtesy and thoughtfulness on the part of the trainmen.

Unlike many electric railways whose fares are lower than those of competing steam carriers, the rates on the Chicago, Aurora & Elgin Railroad between Chicago and most of the suburban towns were substantially higher than those which prevailed upon the lines of its competitors before the increase made by the latter in December, 1925. The ten-ride ticket rates prevailing between Maywood and Wheaton on the one hand and Chicago on the other have ranged from 15 per cent to 35 per cent higher than those on the steam lines. The 25-ride ticket rate has been from 28 per cent to 35 per cent higher than similar rates on the steam lines.

It was believed by the management that if a superior standard of service could be established business would be attracted to the electric railway at higher rates than those charged by its competitors. Moreover, it has been well known for years that the steam railroads operating out of Chicago were running suburban service at a loss. The present management of the Aurora-Elgin decided



Collection of Homeseekers' Tickets Has Been Found to Be an Accurate Index of the Development of the Suburban Territory Served by the Railway

that traffic to be worth while must pay reasonable rates, and it therefore determined not to inaugurate any new fares at the ruinous figures prevailing upon the steam lines. Faith in the ability of good service to attract patronage has been justified by the fact that railway operating revenues have increased more than 65 per cent in three years, while railway operating expenses, including maintenance, rentals and general taxes, increased only 49½ per cent. Net earnings from railway operations have increased more than 154 per cent in 3½ years. Percentages of total traffic handled by the Aurora-Elgin from various towns, passenger revenue by month and a summary of revenues and expenses by year are shown in accompanying tables.

The company has recently marketed successfully a $5,000,000 bond issue, involving the purchase in the open market of more than 90 per cent of an underlying bond issue secured by a closed non-callable mortgage. The old bonds were deposited under a new first and refunding mortgage. The new $5,000,000 25-year, 6 per cent bond issue provides funds for the retirement of the 7 per cent, series A, refunding and improvement bonds issued at the time of the reorganization, and also for an issue of $750,000 in two-year, 6½ per cent notes sold in December, 1924. It provides also a substantial amount of new capital for additions and betterments to be made in the near future. Provision is made for future necessary junior financing through the creation of a prior preferred stock issue and the issuance at this time of $500,000 of such stock.

Municipalities through which this road operates have been growing so rapidly that frequent schedule changes have been necessary in order that adequate service should be furnished. A new schedule has recently been completed which calls for 221 passenger trains per day, divided into three different classes, limited, express and local. This is a slight increase over the previous winter schedule and provides a headway varying from ten minutes to 30 minutes during the entire day for municipalities within a distance of 26 miles of the Loop district of Chicago. Such service enables patrons living in Wheaton, a distance of 25 miles from the Loop district of Chicago, to reach their destinations within the same time or in even less time than they would be able to were they living in certain parts of the city of Chicago.

Running time between Wheaton and Chicago is 45 minutes on limited trains and one hour on local trains. The intervening municipalities are reached in proportionally less time. During the morning and evening rush hours this schedule provides for limited trains every twenty minutes, or less, between Chicago and the western terminals of Aurora, Elgin, Geneva, St. Charles and Batavia, and an hourly limited service to each western terminal the balance of the day. Elgin is more than 41 miles from the Chicago terminal and the total running time of the fastest trains from Chicago to Elgin is 65 minutes. Twenty-six minutes is consumed in going out over the elevated structure to the end of

Well-Maintained Rock-Ballasted Track Permits High-Speed Operation

INCREASE IN HOUSES, IN TOWNS AND VILLAGES CONTIGUOUS TO THE CHICAGO, AURORA & ELGIN RAILROAD, WHEATON TO MAYWOOD

	Wheaton, Per Cent.	Glen Ellyn, Per Cent	Lombard, Per Cent	Villa Park and Ardmore, Per Cent	West Elmhurst to Stratford Hills, Per Cent	Total, Per Cent
1922 over 1921	14.5	24.5	24.9	43.5	19.8	22.2
1923 over 1922	9.1	18.4	22.1	52.3	19.3	20.0
1924 over 1923	7.3	19.2	27.2	52.8	23.2	22.4
1925 over 1924	14.4	32.2	32.8	43.7	41.3	31.3
Cumulative 1925 over 1921	53	133	157	379	148	136

Boarding or Alighting at	Percentage of Total Traffic Handled by the Aurora-Elgin 1922	1925
Elgin	59.8	69.2
Geneva	25.9	40.1
Wheaton	39.9	61.0
Glen Ellyn	48.2	57.3
Lombard	55.2	68.6
Elmhurst	16.3	32.8

Attractive Brick Station at Chicago Golf Club on the Aurora Branch

joint operation at Forest Park, a distance of 9 miles. The remaining 32 miles is run in 39 minutes, including stops to take on and discharge passengers at Lombard, Wheaton and Glen Ellyn.

In spite of these most difficult operating standards an analysis shows that of the total number of trains operated under the present schedule, approximately 100 per cent depart from their terminals on time, and that 95 per cent of them arrive at their destinations on time or less than three minutes late.

Below is a list showing the number of trains operating between Chicago and the larger municipalities along the road:

Stations Between	Miles from Chicago	Number of Trains
Maywood and Chicago	11	95
Bellwood	13	90
Berkley	14	90
Elmhurst	16	91
Villa Park	18	86
Lombard	20	141
Glen Ellyn	23	143
Wheaton	26	144
Geneva	37	34
St. Charles	40	34
Batavia	40	50
Aurora	40	52
Elgin	42	49

Wheaton, Glen Ellyn and Lombard enjoy service which provides 71 trains daily to the Chicago Loop and 73 trains outbound daily from the Loop, this service being operated from 5:45 to 1:30 a.m. Thirty-eight of the 73 trains are fast expresses. In the rush hours these communities enjoy a service approximating a 7½-minute headway. At the east end of the Aurora-Elgin line, where there is a convergence of the fast high-speed limited trains from the Fox River terminal cities, the Wheaton expresses and the Elmhurst short service there now is a train on the average of every 3½ minutes in the direction of heaviest travel, these trains ranging in length from two to six cars each.

Trains operating into and out of the Wells Street Terminal, Chicago, are made up of two to six cars each. In cases where more than six cars are operated, the trains are run in sections, due to the present platform limitations in Chicago. During the summer months, in addition to the regular scheduled trains, excursions ranging from 60 to 120 cars each are operated between Chicago and the park owned and operated by the company in the Fox River Valley.

Six-Car All-Steel Limited Trains Operated on the Main Line Are Run in Three-Car Sections on Aurora and Elgin Branches

The company has capitalized its natural advantages in popularizing its service. In its advertising literature it has continuously featured "No Smoke, No Dust, No Cinders" and has constantly called to the attention of the people in the communities served the remarkable accessibility of its Chicago terminal as compared with those of the steam railroads and the ability of passengers to change under cover and without walking up or down stairs from Aurora-Elgin trains to elevated trains, taking them to any department store or most business establishments or places of amusements in the Loop district of Chicago without setting foot in the street.

RECORD OF PASSENGER REVENUES BY MONTHS

	1922	1923	1924	1925
January	.....	$126,988.58	$132,643.25	$149,011.26
February	.....	109,022.48	125,600.91	133,259.93
March	.....	122,951.70	137,172.30	143,676.82
April	.....	131,406.62	140,052.71	149,478.47
May	.....	155,092.68	164,222.16	175,388.65
June	.....	158,081.20	158,236.75	173,140.55
July	$163,599.29	174,809.50	173,981.65	179,920.47
August	164,427.63	176,490.23	177,800.94	187,382.04
September	145,037.74	158,908.83	159,934.14	166,787.56
October	139,147.59	143,694.39	154,521.47	160,552.54
November	130,709.52	140,849.78	151,900.52	164,335.84
December	138,223.80	146,716.09	152,008.65	168,641.72
Totals	$881,145.57	$1,745,012.08	$1,828,075.45	$1,951,575.85

Great emphasis has been placed upon the cleanliness of the cars, keeping the seats in first class repair and condition, spotless toilets and other like features demanded by a discriminating public.

STATIONS HAVE BEEN MODERNIZED

The management has carried out a program of thorough rehabilitation and modernization of its terminal stations in Aurora, Batavia, Geneva, St. Charles and Elgin and has painted and put into first class condition all other passenger stations. Lately a new brick station has been built at Seventeenth Avenue, Maywood, and the company is now constructing an artistic passenger station at Glen Ellyn.

These are the more important principles evolved and applied by the management in building up the passenger traffic of the property. The faith shown in the ability of an electric railway to hold its own in competition with steam railroads of the highest class when the most modern type of facilities are provided and modern methods of operation and improvements in service are employed has been strikingly justified.

Railway Turns Tables on Auto Dealers

SOME time ago the Mobile Light & Railroad Company published an advertisement in the local papers calling attention to the expense of using private automobiles for business and the economy of street car riding. An article by R. S. Kellogg, secretary of the News Print Service Bureau, published in the *Nation's Business* was quoted showing automobile operating costs, as follows:

	Car 1	Car 2	Car 3
Cost of car	$792.90	$1,379.74	$2,238.22
Mileage	14,000	13,494	33,100
Years used	2.5	3.16	3.71
Depreciation per mile, cents	3.0	4.9	5.0
Repairs, upkeep, etc., per mile	2.6	4.7	2.0
Tires per mile	2.0	2.4	1.9
Insurance, licenses, etc., per mile	1.5	2.4	1.6
Gasoline	1.5	1.9	1.0
Garage	.4	1.7	1.0
Total, cents	11.0	18.0	12.5

Ford dealers in Mobile came back at the railway with an advertisement stating that a Ford can be operated for 3.92 cents per mile. This figure was arrived at by the following calculation:

Fire and theft insurance	$12.00
Liability and property damage insurance	29.40
License	12.00
Taxes	12.00
Tires	84.00
Gasoline	201.60
Oil	39.60
Mechanical and oiling	72.00
Battery	13.80
Depreciation	125.40
Total operating cost	$601.80
Miles run	15,120
Cost per mile, cents	3.92

Not to be outdone, the railway retorted:

We challenge the statement that the depreciation on said car was only $125 for 15,120 miles, or $0.0082 + per mile. At that rate a Ford car would run approximately 62,445 miles before scrapping.

The depreciation on a car is the difference between original cost and the amount received for the car after use.

We advise all owners of Ford cars to take their cars to a Ford agent, after they have run their cars 15,120 miles, and show the agent his ad in the *Register* of Oct. 31, 1925, and demand a new car, turning the old car in at original cost of $516.35 less $125.40 depreciation, they to receive $390.95 for the old car. The agent will do this, because he advertises the depreciation is only $125.40 on a Ford for 15,120 miles.

The result of the controversy was that the automobile dealers were overrun with people demanding an exchange at the figure mentioned in the advertisement. This they were not prepared to do and consequently were compelled to acknowledge their mistake in publishing the figures.

Parking Restrictions Speed Up Cars and Aid Retail Trade

CHECKS made by the research department of the Pittsburgh Railways show that there has been a substantial reduction in the running time of street cars since the new parking restrictions have been in effect in the downtown district. Detailed information concerning these regulations was published in ELECTRIC RAILWAY JOURNAL for May 30, 1925, page 847. Time saved by cars routed over various loops is shown in the accompanying table.

TIME SAVED BY CARS ROUTED OVER VARIOUS LOOPS

Loop Number	Number of Cars During Maximum Hour	Average Decrease in Time, Minutes
1	26	1:01
2	84	2:47
3	81	3:51
4	27	5:21
5	57	2:55
6	23	:25
7	20	:56
8	52	:35
9	159	3:17

It is significant also that retail trade in the downtown district has prospered more than that in the outlying sections since the change was made. Comparisons are given below of the buying power of the Pittsburgh district, as represented by bank payrolls in 1924 and 1925; retail sales for the entire district and downtown sales, as represented by seven large department stores.

Three Months Ended	Buying Power, Per Cent	Retail Trade: Entire District, Per Cent	Retail Trade: Downtown, Per Cent
March 31	—9.01	—1.87	—2.53
June 30	—1.77	—5.90	—2.37
Sept. 30	—3.67	—6.20	—2.77
Dec. 31	—8.13	+1.50	+3.47
Year	—5.72	—2.80	—0.80

Industrial depression resulted in a slight decrease in buying power and trade, but the decrease in the downtown section, 0.8 per cent, was much less than that of the district as a whole, which was 2.8 per cent. The fear expressed by some downtown merchants that their business would be injured by the stringent parking regulations appears to have been without foundation.

Earnings of the Pittsburgh Railways decreased 1.67 per cent as compared with a decrease of 5.72 per cent in buying power for the district.

Impressions of European Tramways

Conditions and Practices in Several Continental Cities Indicate that in Some Essential Things, Such as Courtesy, the Europeans Excel—Short Four-Wheeled Cars Are Standard Nearly Everywhere, but Operation Is Almost Noiseless—Few Abandonments of Tramway Lines Noted, but the Bus Is a Factor in Extensions

By James A. Emery
Vice-President Ford, Bacon & Davis, Inc., New York

The Royal Exchange, London, a Heavy Traffic Point. Tramways Do Not Operate in This Part of the Business District

CITY transportation systems abroad appear to be in much better shape than other lines of industry. On the Continent, particularly, tramway cars are noticeably crowded; that is, carrying many standing passengers, even during off hours. The general condition of the physical property is good. Cars are clean and well painted, and track, with a few exceptions, is excellent. The large traffic volume can probably be ascribed to the movement of population from country to city that has taken place since the war in spite of unemployment. The physical condition is undoubtedly due to good habits of maintenance, high standards of design and cheap labor.

It is hardly likely, notwithstanding good appearances, that the tramway lines are generally prosperous, as fares are very low measured by our standards, for rides of average length. In a large proportion of European cities the tramways are owned and operated by the municipalities, so that the necessity of paying all expenses and a satisfactory return on the investment is not so urgent as with private companies.

The zone system of fares is very common, and as the platforms are open the conductor is a busy man. He wears a little satchel or wallet for his tickets and change and gives every passenger a punched ticket or receipt, which, however, is not collected when the passenger leaves the car. In Vienna, and probably in some other cities, a monthly pass is sold for about $3.25 (U. S. equivalent).

It is probably in part due to the zone fare system that the use of one-man cars has not been attempted to any great extent.

In England the traffic is noticeably lighter than on the Continent, but municipal systems, particularly in London, seem to be operating more service than the volume of traffic warrants. This may be due to the unemployment situation. The London tramways are

Mr. Emery's observations were made on a somewhat hasty pleasure trip through England, Belgium, Holland, western and southern Germany, Austria, Italy, Switzerland and France. No attempt was made to study the urban transportation situation, so that only such matters are covered as naturally attract the notice of one interested in the business.
—EDITOR

said to be hardly earning their working (operating) expenses.

Tramways are not permitted in the inner or principal business sections of London and Paris.

To an American the prevalence of narrow gage track is interesting. Perhaps two out of every three systems are narrow gage, 3 ft. in Great Britain and 1 m. (39.38 in.) on the Continent. Narrow grooved rail is universally used in paved streets. The substructure is integral or identical with the paving base, and the rails are held by steel ties or cast-iron chairs imbedded in the concrete base and spaced about 5 ft. apart. Heavy flat tie rods are used and no joint welding was observed, although it is understood that welding has been practiced to some extent. As the wheel loads are light this construction preserves its line and surface for a long time, and if it goes bad, repairs are made at once so that there is very little rough track or paving in evidence.

Overhead wires are kept in first-class shape. Nothing is used but steel or iron for poles and structural or built-up poles are common. Concrete protection for poles around the base is often seen. Sliding contacts are used almost altogether on the Continent instead of trolley wheels. In the zones immediately surrounding the inner sections of London and Paris there is much slot construction, and in Paris the slot is formed along the inner side of one of the running rails.

Short four-wheeled cars are standard nearly everywhere on the Continent, with a notable exception in Paris, and in the larger cities they are operated in trains all day long with one motor car and from one to three trailers. Some of the trailers are very light with very small wheels and low floors. In Great Britain double-deck cars are used on all the larger systems. The stairs lead up from the rear platform and the upper deck is inclosed. On the Continent they have a fancy for delicate colors. Such colors would be fantastic in our cities, but in the clean, picturesque European streets they are rather pleasing and not at all out of place. Of course it is necessary to keep such paint clean, and the paint and varnish must be well looked after. The finish often looks like a furniture job.

Compared with American operation, the cars are almost noiseless. While much of the credit for this is due the track, yet it speaks for close fits and frequent tightening of all truck parts and for close attention to gears and pinions.

There are no inclosed platforms on city cars. This, together with operation in very narrow streets, would seem to look bad for the accident account, but it is probably not as important with them as it would be with us. In some streets the rail cannot be more than 3 ft. from the building line. Street traffic even in London is nothing like as great a problem as it is with us, because automobiles have not come into such general use. In Rome, for example, a city of 900,000 population, there are very few traffic policemen. Pedestrians seem to be more wary than here, for automobiles and taxicabs go tearing through the narrow streets tooting their horns most urgently, but nothing happens.

Next to their standards of maintenance the most important particular in which European tramways excel ours is in route signs. All routes are numbered. The numbers show in big figures on the signs and are so well advertised that every one is familiar with them. In addition, the destination and generally the principal streets operated on are named on the outside signs. Inside, the complete route and rates of fare are conspicuously displayed. In the subways each car carries several large cards showing the line diagrammatically with every station and transfer point. In the subway stations the signs are so complete that it is not neces-

Suspended Railway Running from Vohwinkle to Barmen in the Rhine District of Germany

sary for the stranger to ask a single question. Folders and small scale maps are widely distributed describing the routes in detail and giving directions for reaching all points of interest. The routes are so well advertised that the public, particularly hotel people and policemen, are surprisingly familiar with them. In London and Paris stopping points are indicated by neat, distinctive signs.

On the Continent buses are not used to any extent, except in the largest cities. This is probably due to municipal operation of so many tramways and to lack of funds. In England bus lines are fairly common in the principal cities, but do not seem to be permitted to poach on the tramways to the extent that they have done in London.

Of much interest to an electric railway man is the extensive program of electrification of steam railway lines that is in progress. A large portion of the suburban service around London and Paris has been electrified, and in Switzerland and the mountain districts of Italy where coal is dear and water power plentiful much work is going on.

Tramway men acknowledge that future extensions of service will have to be provided for by buses as the cost of tramway construction is prohibitive as compared with bus installation.

There has been very little abandonment of tramway lines and no cases of bus substitution came to notice.

The suspended railway (Schwebebahn) running from Vohwinkle through Elberfeld to Barmen in the lower Rhine country is a novel and interesting system of transit. The cars are suspended by gooseneck hangers from a single rail, there being two hangers per car, each attached with motor to a two-wheel truck. The rails are carried by latticed trusses running longitudinally and hung on cross-frames shaped like an inverted U or V. The line is about 6 miles long and the greater part of it is located over the Wupper River, a small stream from 100 to 120 ft. wide. The river bed is very crooked so that the railway alignment is a succession of curves. This, together with the frequent stations, results in a rather low average rate of speed. There is an intensive industrial development all along the line, so that two-car trains were well filled on five-minute headway during off-peak hours.

This suspended railway has been in operation for over 25 years, so that its practicability is well proved. It is much less costly to build than an elevated railway of standard type and makes comparatively little obstruction. It has favorable operating features in point of comfort, quietness and minimum stair climbing. In view of the apparent success of this system, from a technical standpoint, and its several advantages, it seems singular that it has not been used or seriously considered in many cities where rapid transit is needed but where the traffic is not heavy enough to support a subway or elevated line of standard type.

While definite conclusions can hardly be drawn from "horseback" observations, it seems fairly clear that European tramways are far ahead of American in car signs, advertising, maintenance standards and courtesy of operatives. They have made a quicker "comeback" since the war than other industries so far as volume is concerned, but in spite of this they are not earning cost of service, so that a part of their support must be coming out of general local taxes. Future extensions will be taken care of by buses. Municipal operation is apparently efficient under European conditions in so far as quality of service is concerned.

Wages on European Electric Railways

WAGES paid to motormen and conductors on the tramways in Europe are far less than those prevalent in this country. Statistics giving information up to date on European wages were presented in a report at a meeting held in Brussels in July, 1925, of the personnel connected with European tramway companies. This report gives for all the principal European countries the average hours per week or per day of the employees in the transportation and maintenance service, with wages paid, accident and sick benefits awarded, and other similar information.

In Great Britain a motorman is paid somewhat more than a conductor and averages, according to the size of the city, from $12.84 to $15.24 a week. These wages are based on a standard week of from 48 to 52 hours. The conductors get about a dollar less per week. These statistics are taken from the reports of 142 tramway systems, of which 90 are municipally owned and 52 under private operation. The tramways in Great Britain employ more than 50,000 persons, of whom 12,620 are employed in London.

In Holland there are nine tramway systems, of which five are municipal, and the transportation employees in Holland earn from 30 to 40 kronen a week, or from $12 to $16. They work from eight to eleven hours per day.

In Italy the wages are considerably lower. For transportation employees they average 780 lire, or about $28 per month, and the men work from 8⅔ to twelve hours a day. Italy has 44 city tramway systems, with about 30,000 employees.

In Sweden the wages of the men seem to be as high as anywhere in Europe. That country has eleven tramway enterprises, of which eight are municipal, and 2,402 men are employed. Forty-eight hours a week is the standard period of work and the wages average from $54.67 a month in the small towns to $72.36 in Stockholm. After about twelve years of service a man in the small town can work up to a monthly wage of $67.80, while the motorman in Stockholm can expect $89.80 a month after twelve years of service.

There is only one railway system in Alsace-Lorraine, that in Strassburg. The men make from $21.18 to $24.75 per month. Married men get $2.50 more a month, as well as 75 cents a month extra for each child under fifteen years. Overtime is paid at the rate of 14 cents an hour before midnight and 24 cents an hour after 12 p.m.

Accident Record Good in St. Louis

ACCIDENTS for the year 1925 on the lines of the United Railways, St. Louis, numbered 19,171, which is the lowest figure of the last four years. Of this total 10,775, or 56.2 per cent, were collisions with other vehicles. This, the largest class of accidents, has grown steadily from 323 in 1907 to a maximum of 12,609 in 1923. Starting organized safety work in 1924, the company was able to check the increase and accomplish substantial decreases in 1924 and 1925. This has been done despite the fact that the number of motor vehicles in St. Louis has increased from 80,556 in 1923 to approximately 150,000 at the present time. Except for the item of collisions with motor vehicles, the accident record of the railway for 1925 is the lowest in the nineteen years, beginning with 1907, for which records are available. All other accidents total 8,396, as compared with a maximum of 22,167 in 1909.

Accidents for the past year are classified as follows:

Type of Accidents	Number
Collisions with wagons	444
Collisions with persons	531
Collisions with animals	41
Car collisions	270
Car derailments	130
Boarding and alighting	2,046
Falls in car	951
Disturbances	534
Car equipment failures	42
Miscellaneous	1,966
Transportation employees injured	115
Power plant and line employees injured	216
Maintenance of way injuries	419
Shop injuries	307
Electrolysis	31
Struck by car doors	353

Fatal accidents in which the United Railways was involved numbered 31. The low record of fatalities occurred in 1920 with 25, and the high record in 1910 with 70. Car-miles numbered 2,465 and passengers carried 23,831 per transportation accident in 1925. Per passenger injury, the car-miles averaged 11,542 and the number of passengers carried 111,595.

Association News & Discussions

Diesel-Electric Locomotives Discussed in Joint New York Meeting

SOMEWHAT conflicting views were presented at the meeting held in New York on Feb. 18 when the Metropolitan Sections of the four great engineering societies—civil, electrical, mechanical and mining and metallurgical—met to discuss the Diesel engine and its effect on heavy traction. This is not strange because the Diesel locomotive is a newcomer in the railroad field.

C. A. Stein, general manager Central Railroad of New Jersey, was the first speaker. Progress of the steam locomotive was depicted in stating that the present locomotives are 34 times as heavy and 52 times as efficient as the first 8-ton, 2,000-lb. tractive effort locomotives used in the United States in 1829, almost 100 years ago. For the first 70 years the railroads expanded and grew in size, but made few changes in the design of the steam engine used for propelling the locomotive. Since 1900, however, many improvements have been made, until now almost too many things are placed on the locomotive. Mr. Stein inferred that the steam locomotive has almost reached the limit of its development.

The speaker mentioned several objections to electrification, the first and principal one being its high cost. He feels also that there is a danger in the third rail and the high voltage overhead trolley. Sleet and ice have proved a real interference to third rail operation and also, to some extent, to overhead trolley. Troubles at the power house and on the transmission lines cripple electric operation of the entire zone rather than of one unit only. While the thermal efficiency of the electric engine is greater than that of the steam locomotive, he believes that it is not as efficient as the Diesel engine. The Diesel engine undoubtedly will find an important place in steam road operation, particularly in terminals, whether electrified or not, until one standard system of railway electrification can be determined upon.

The Central Railroad of New Jersey is operating one Diesel locomotive in its Bronx terminal. It is self-contained, requiring no heavy investment to provide for peak conditions. One unit is just as efficient as it would be if Diesel locomotives were used throughout. In other words, a changeover from steam to Diesel engine can be made gradually, as conditions warrant.

High grade mechanics are not necessary in Diesel engine maintenance, according to the speaker. In common with electrification, the steam road is freed of water tanks, cooling stations, water scoops, ash-handling equipment and other similar necessities to steam locomotives. This one Diesel locomotive operating in the Bronx yards has a fuel cost of only one-fifth that of the steam locomotive it replaced, because on account of smoke reduction the steam locomotive had been burning anthracite at $8 a ton. Mr. Stein feels that the Diesel-electric or oil-electric locomotive is going to find a very definite place in steam road operation and will be a considerable competitor to electrification.

Hart Cooke, of the McIntosh-Seymour Corporation, stated the case for the Diesel locomotive. Mr. Cooke's paper is abstracted elsewhere in this issue.

Electrification Favored by Mr. Storer

N. W. Storer, general engineer Westinghouse Electric & Manufacturing Company, delivered an outstanding paper in favor of electrification. Mr. Storer's paper will be found elsewhere in this issue.

Edward B. Katté, chief engineer electric traction New York Central Railroad, read into the records a few remarks, reproduced elsewhere, and showed several tractive effort curves of the freight and the passenger Diesel locomotives designed for the New York Central, in comparison with steam locomotives. These are the first Diesel locomotives used in this country for road service.

W. B. Potter, chief engineer railway department, General Electric Company, in a brief discussion, said that the electrical engineer must think of electrification in the terms of transportation. The speaker has long been interested in both electrification and internal combustion engines, and while he believes that the Diesel locomotive will find an important place in steam road operation, because of its high thermal efficiency, he sees no fear for heavy electrification of trunk lines because of this unit. Mr. Potter looks forward to the future of steam road operation as being capable of absorbing all of these forms of locomotion in their proper place.

Sidney Withington, electrical engineer New York, New Haven & Hartford Railroad, rose to the defense of the electrical operation of his road between New York and New Haven, saying that its reliability had been greater than under steam locomotive conditions, despite the dependability upon a power station and transmission line. Also, he is not alarmed as to the personal injury possibilities mentioned by one of the other speakers, saying that it is only a matter of education to warn people of the dangers of the third rail and the high-tension trolley. During the shopmen's strike a few years ago it was a very significant fact that the electric locomotives were better maintained by the unskilled labor available than were the steam locomotives, an important point in favor of electric locomotive operation.

Mr. Withington said that the system of electrical operation should be standardized, particularly in the East, where the steam roads of one company come in contact with others so frequently that it would be an annoyance and an expense if many of these other roads were electrified by different systems.

Even in the congested districts in New York the sum of all rated power of the New Haven electric locomotives is four times the capacity of the power house, indicating clearly the effect of the diversity factor. Diesel locomotives would be more expensive, not only because of the greater expense of the Diesel engine per horsepower, but because it would be necessary to supply so much more generating capacity than would be possible under full electrification operated from central power stations. Likewise, the future oil supply may seriously affect the economic status of the Diesel engine in the future, in the opinion of Mr. Withington.

W. S. Murray said that the final answer was an economic one, and that the annual charge composed of the two factors, one of operating and the other of fixed charges, must determine the usefulness of any type of locomotion. He has little fear for electrification as a whole, but sees an opportunity to use the Diesel engine in yards, branch lines, and perhaps on road work on long light lines that do not require heavy trains and are not encumbered by heavy grades.

Several others discussed various points that were raised by the speakers. The entire meeting showed a great interest in the subject and a desire for some type of engine to replace the steam locomotive under conditions that are not favorable to its operation and maintenance.

The Diesel Locomotive Must Prove Itself*

By E. B. Katté
Chief Engineer Electric Traction
New York Central Railroad

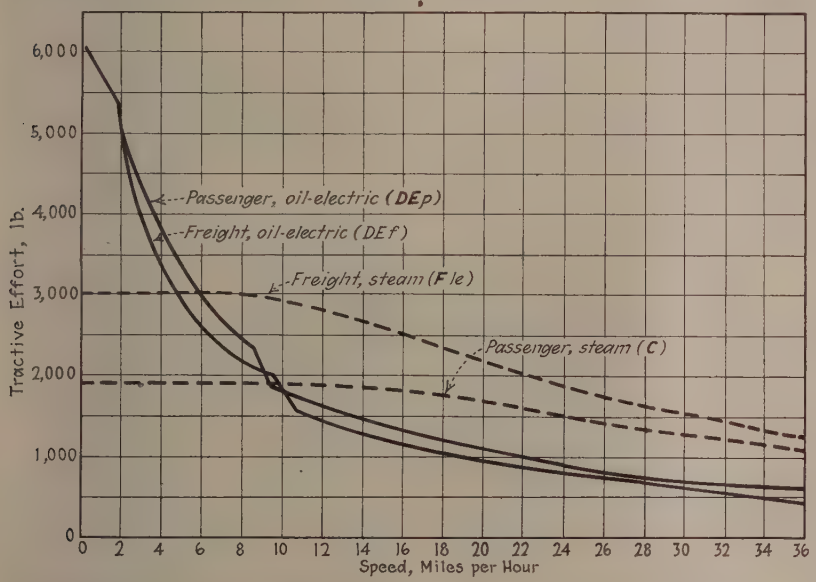
SUCH a locomotive as the Diesel should promote the extension of heavy electric traction in that it may be considered a competitor of the electric locomotive in certain fields, and as such, should tend to reduce the cost of electric locomotives.

The most promising field for the Diesel locomotive is in switching service in non-electrified yards, or between yards operated under different systems of electrification; also on railroads

*Abstract of discussion before a joint meeting of A.S.C.E., A.S.M.E., A.I.E.E., and A.I.M.&M.E., New York City, Feb. 19, 1926.

with relatively infrequent service, or on branch lines where the traffic is not heavy enough to provide an operating saving sufficiently large to cover the increased fixed charges incident to electrification. To compete successfully in either of these fields the Diesel locomotive must operate practically noiselessly and smokelessly; the economy in operation must at least equal that of the electric locomotive and the first cost must be less than the combined cost of the electric locomotive and the working conductors.

During the preliminary exposition of the advantages of the Diesel locomotive, railroad engineers have accepted without argument the first three requirements, knowing that the contract trials will demonstrate their truth or fallacy. With regard to the ultimate cost of the unit there is still grave question. The prices thus far quoted are excessive, considering the small capacities offered. It is only in the hope that prices will be very materially reduced when Diesel locomotives are built on a mass production basis that railroad engineers have been able to recommend the trial orders thus far awarded.



Comparison of Tractive Effort, New York Central Steam and Oil-Electric Locomotives

Like all other railroad problems this is one of economics. There is no question but there is a field for the Diesel locomotive adjacent to and bordering those fields now occupied by the steam locomotive and the electric locomotive, but its economic advantage over both must be firmly established before the railroads can invest very heavily in this new type.

Thus far the principal development of Diesel locomotives in this country has been for switching, in relatively small sizes. Such a locomotive was tested by the New York Central Railroad during the summer of 1924. These tests were very encouraging but clearly indicated that a locomotive of greater capacity was desirable.

Since that time the engineers of the New York Central have diligently endeavored to interest manufacturers in the production of an oil-electric locomotive weighing about 100 tons and capable of developing about 1,000 hp. As a result of their activity two orders have been placed for Diesel-electric road locomotives. The one for passenger service will contain an 800-hp. McIntosh-Seymour engine. The weight of this locomotive is about 148 tons. It is intended for light passenger service on the main line of the Putnam division. The freight road locomotive will weight about 128 tons, and the power will be furnished by a 750-hp. Ingersoll-Rand engine.

Tractive effort and speed characteristics of these locomotives, and of the steam locomotives which they are intended to supplant, have been plotted to the same scale and are shown on the curve reproduced elsewhere. Both the passenger and the freight locomotives will be equipped with four General Electric motors, each having a continuous rating of 266 hp. The locomotives will be arranged for multiple-unit operation, two or more being coupled together for hauling heavier trains.

The speed of the passenger locomotive hauling average trains on the Putnam division will be between 15 and 50 m.p.h., depending upon the weight of the train. The maximum safe running speed of this locomotive light will be 60 m.p.h. The freight locomotive is designed to haul the average weight trains on the Putnam division between 8 and 35 m.p.h., with a maximum safe speed of 45 m.p.h.

Effect of Diesel-Electric on Railroad Electrification*

BY HARTE COOKE
McIntosh-Seymour Corporation

PROBABLY the best way to get an idea of the effect of Diesel-electric locomotives on the electrification of steam railways is to look into the characteristics of the different types of motive power and take up the requirements of some of the special kinds of railway service, so that we may see what the special conditions are and what motive power would be best suited for the service.

The tractive effort curve has a maximum value which is limited by the weight on the driving wheels. This total weight on the driving wheels is limited by the axle loads permissible for any given track structure and also the number of driving wheels which can be used. A steam locomotive will maintain this maximum tractive effort practically constant up to about 10 m.p.h. Then the tractive effort falls off approximately inversely as the speed, approaching a hyperbola which is limited by the horsepower which can be developed by the cylinders and the boiler capacity of the locomotive. With this form of tractive effort curve the locomotive can pull at considerable speed any load which it can start. Full horsepower capacity is only developed at relatively high speeds.

As a matter of reference we will refer to the weight, first cost, fuel cost and time the engine is in service of the steam locomotive as 100.

The Diesel-electric locomotive has the important peculiarity of being able to develop its full horsepower at any speed, and this with the even torque of the electric motor gives very high tractive effort at starting. The weight of the locomotive is such that practically all of this can be utilized.

The tractive effort of a Diesel-electric locomotive varies in general inversely as the speed, the curve being approximately a hyperbola equivalent to the net horsepower that the locomotive is able to deliver. This gives the locomotive ability to start very easily any load it can draw at a reasonable speed and this large tractive effort at starting also gives high accelerations. In regard to weight, the Diesel-electric locomotive will weigh about 50 per cent more per horsepower than the steam locomotive; say we will represent this by 150. The cost per horsepower will be in the neighborhood of three to four times as much as the steam locomotive, which we will represent as 300 to 400.

In regard to maximum output, this type of locomotive can be arranged for multiple-unit control, so any amount of output desired can be provided.

With this type of locomotive the fuel and water necessary for a great many miles can be carried on the locomotive so that no tender is required. With the same relative leeway as used for the steam locomotive, and allowing for the absence of standby losses for the Diesel locomotive, we find that the fuel cost will be represented by 30.

Because of the freedom from operating delays and those caused by servicing and maintenance, the time in active service of a Diesel locomotive would be represented by 200, about twice what is usual with a steam locomotive.

On the same basis the electric locomotive would have a weight per horsepower equivalent to 75 as compared to steam, a cost of 300 to 600, depending upon the power station requirements; a fuel cost of 37 and a time in actual service equivalent to 225.

*Abstract of discussion before a joint meeting of A.S.C.E., A. S.M.E., A.I.E.E. and A. I. M. & M. E., New York City, Feb. 19, 1926.

From a detailed analysis of the various fields in which the Diesel locomotive might be used we conclude that for very light traffic the freight and through passenger traffic can best be handled by the steam locomotive and the local passenger traffic by gas rail cars to keep the capital expenditure to a minimum, as the traffic is not heavy enough to allow the savings accruing from the more economical operation of Diesel-electric locomotives or full electrification to balance the increased capital cost.

As traffic increases, changed conditions should be carefully analyzed to see when the steam locomotive should be supplemented by Diesel-electric, the Diesel-electric making the best showing when it can operate the most miles per day.

The capital cost for full electrification is variable and becomes less as the traffic density increases. It is a rugged arrangement and can give much service at a low fuel cost if used in heavy traffic. Under these conditions the capital costs are reduced to an amount which the fuel saving justifies.

The Diesel-electric has an important difference from full electrification in that the investment can be made gradually and the benefits obtained at once and in proportion to the extent to which it is used.

All of the above shows that the three kinds of motive power are supplementary:

For light traffic, steam.

For heavier traffic, Diesel-electric.

For very dense traffic, full electrification.

Some Features of the Diesel-Electric Locomotive*

By N. W. Storer
General Engineer Westinghouse Electric & Manufacturing Company

RAILWAY people the world over show a tremendous and widespread interest in the Diesel-electric locomotive. This is simply indicative of the need for a locomotive which, while having all the advantages of steam as an independent motive power unit, avoids many of its disadvantages. The Diesel electric avoids much of the smoke, dirt and noise, the frequent trips to the roundhouse for attention to fires and boilers, and for fuel and water. It has four times the thermal efficiency of the steam locomotive and adds to that all the flexibility and easy control of the electric.

The steam locomotive is one of the greatest machines in the world but the interest aroused by the Diesel electric shows how anxious the railways are to get something better, how thoroughly everyone has come to believe that it is only a question of time when it will be superseded. Whether the Diesel engine is to displace it is another matter.

After the engine itself the great problem is the transmission of the energy developed to the driving wheels. Direct mechanical connection is more or less satisfactory for very small outputs, the hydraulic with a little larger capacity; and a combination of the two is being exploited in Europe. Practically everyone in this country who is working on a locomotive to be operated with the Diesel engine is using the electric system of transmission, indicating that there are serious limitations to the mechanical and hydraulic systems and that the great superiority of the electric is generally accepted. On the face of the matter, it would seem that a direct connection between the engine and the drivers would be the simplest and most efficient, but since the Diesel engine is not self-starting and does not operate satisfactorily at very low speeds, a direct connection is impracticable and any mechanical or hydraulic means, while possibly satisfactory and reasonably efficient when new, will continually develop troubles and will lose its efficiency with age. The electric transmission system, while admittedly being more or less expensive and heavy, is extremely simple to operate, absolutely flexible in its speed-torque characteristics and maintains the same efficiency throughout its life.

*Abstract of discussion before a joint meeting of A.S.C.E., A.S.M.E., A.I.E.E. and A.I.M.&M.E., New York City, Feb. 19, 1926.

Similarity of Diesel Electric to Motor-Generator Type

The Diesel-electric locomotive is very similar in its characteristics, performance and equipment to the motor-generator type of alternating-current locomotive which takes power from a single-phase trolley and utilizes a synchronous motor to drive a direct-current generator which furnishes current for the driving motors. The Diesel electric substitutes the engine with its auxiliaries for the synchronous motor, transformer and all other parts of the equipment pertaining to them. The equipment, from and including the direct-current generator to the motors, is or may be practically the same. Speed regulation is by voltage control of the generator in both cases. The motors for both are low-voltage, direct-current series machines, with all of their rugged characteristics. The main difference between the Diesel electric and the motor-generator type is that the output of the former is limited to a very definite value which may be carried for long periods, while the synchronous motor, which the same continuous rating, has a great power house back of it and may carry very heavy overloads for short periods. The Diesel electric in this respect has almost the same limitation as the steam locomotive. Its horsepower capacity is limited. It can exert the same maximum tractive effort as the all-electric because of the motor drive, but only at very low speeds.

On a Diesel-electric locomotive, the generator and motors must be considered as a unit in calculating the output of the locomotive. The most important features of the electrical equipment are:

1. The ability to utilize the full capacity of the engine at whatever train speed it is needed or desired.
2. A high efficiency so as to transmit the maximum amount of energy from the engine to the wheels.
3. Simplicity of control.
4. Light weight.

What are the characteristics of the electrical equipment that will best utilize the engine capacity? Voltage control of the generator has already been mentioned as giving the maximum flexibility for control of speed and tractive effort. This, however, is operative only up to the normal voltage of the generator and over most of the range while overloading the motors and generator. Over-voltages are sometimes secured by forcing the generator field. Where the voltage is limited, as is necessarily the case with a generator designed for a definite voltage, further speed control may be secured by weakening the fields of the motors, and there is no reason why a very considerable range of speed cannot be covered in this way. Difficulties from commutation of the motor at weak fields and high speed might be serious with motors taking current from a trolley with all its fluctuations and surges in voltage, but it is much less serious where the power plant goes with the motors. It must be remembered that neither generator nor motor is overloaded while operating with weak fields on the motors.

The efficiency of the electrical equipment is of the utmost importance, not simply on account of the fuel consumption, but because the higher the efficiency the greater will be the energy of the locomotive available at the wheels. Every effort should be made to make it as high as possible. The electrical equipment, when properly designed, will have an excellent all-day efficiency.

With all of the complications of the Diesel engine and its auxiliaries to contend with, it is all the more necessary to have a simple electrical control system. There are a number of ways to secure this feature. The one most commonly used provides an automatic control of the generator voltage which limits the output of the generator to the capacity of the engine so that the engine is in no danger of being stalled. This is usually combined with engine speed control. It is very desirable with the Diesel engine to keep the speed as low as possible for the output that is required, as low speed means lower maintenance, and especially lower consumption of lubricating oil, which is usually one of the most expensive items of operation. It is fortunate that this idea of variable engine speed combines very readily with a good control system for the electrical units of the power plant.

The auxiliaries on a Diesel-electric locomotive are like the auxiliaries on other kinds of locomotives—very important and very annoying. The Diesel engine requires pumps for water circulation and for lubrication. It requires air filters and radiators with a thorough ventilating system for cooling the engine. There must be ample

capacity of air compressors for the brakes and control. These are preferably driven electrically, either from the main generator or from an auxiliary supply system. Means must be provided for starting the engine. This is a matter of the greatest importance, since if the engine cannot be started, it is useless. It is usually started by compressed air, a pressure of from 200 to 500 lb. being necessary. In some cases the engine is started by current from a storage battery using the generator as a motor. Of course, a comparatively small amount of control equipment for the electrical apparatus will be necessary, but the sum total of the auxiliary equipment amounts to quite a large proportion. Last, but not least, is a good supply of fuel, oil and water.

Weights of Diesel Locomotives Are High

Diesel locomotives that have been built thus far range in weight per horsepower from 207 lb., which was in practically the first locomotive built, to 400 lb. The largest one built in this country to date, the 1,000-hp. Diesel electric built by the Baldwin Locomotive Works, with electrical equipment manufactured by the Westinghouse Electric & Manufacturing Company, weighs 275 lb. per horsepower. It is probable that it will be some time before locomotives weighing less than 200 lb. per horsepower can be built regularly with Diesel electric equipments.

Therefore, when I give 200 lb. per horsepower as the low limit for the Diesel-electric locomotive, I give a figure which has never yet been attained and which will require all of the ingenuity and refinements available to secure. For the present, it is much safer to figure on a weight of 250 to 300 lb.

The Field of the Diesel-Electric

Is the Diesel-electric locomotive going to displace all of the steam locomotives and eliminate the electric from further consideration? It is quite unnecessary for anyone in the steam or electric locomotive business to be alarmed at this time. Samuel M. Vauclain has said that much time will elapse and many millions of dollars be expended to develop the Diesel-electric locomotive to a point where it will figure to any great extent in transportation service. While Mr. Vauclain is probably right so far as trunk-line service is concerned, it undoubtedly will have a definite field in transportation circles. The first and probably the most important field will be on branch lines of railroads in service such as the Canadian National Railways is handling with its Diesel-electric cars. Switching is a most desirable place for the Diesel electric. The ordinary steam switchers used around buildings are a great nuisance on account of the noise, smoke and dirt which they disseminate. They are also expensive to maintain. The Diesel-electric eliminates a great part of the nuisance, is able to stay on the job for many hours at a time and probably will require little maintenance when it is taken to the roundhouse. These features, together with the flexibility of the electric transmission and the fuel economy, make it a most desirable successor to the steam locomotive. It is preferable in some situations in large cities to the electric switcher, since it eliminates the necessity for the overhead wires or third rail which are extremely difficult to apply in and around buildings and represent a high investment from which little return is possible.

The Diesel-electric will probably find a certain field in main-line service, especially for low-speed freight haulage, where the weight per horsepower is no particular disadvantage. It will be particularly useful in this respect on branch lines where the traffic is comparatively light. Further than this, no one can speak with any degree of certainty at this time, but in general it is not probable that it will be used to any extent for other than low-speed traffic for some years to come.

There is one point concerning it which cannot be too often emphasized; its use does not eliminate the fundamental limitation of the steam locomotive, namely, that its power is limited to the amount that can be generated on the locomotive itself, while the electric always has all the power it can utilize.

Electrification

Electrification will go forward in terminals and on the railways having heavy traffic where the investment in overhead lines and substations does not represent a considerable part of the cost of electrification. The Diesel-electric and the straight electric locomotive will move side by side in improving the transportation of the railways of the world. The steam locomotive will still roll along for many years, as it has advantages which are hard to overcome. It must be understood, however, that the steam locomotive is not the simple machine it once was. The improvements which have so greatly increased its capacity and efficiency have made it a very complicated machine and one which is most difficult to maintain. These are the reasons which will ultimately compel the retirement of a large part of them in favor either of the all-electric, the Diesel-electric or some other independent type of locomotive.

COMING MEETINGS
OF
Electric Railway and Allied Associations

March 5 — Metropolitan Section, A.E.R.A., 29 West 39th Street, New York, N. Y.

March 8-11—National Railway Appliance Association, annual exhibition, Coliseum and Annex, Chicago, Ill.

March 9-11 — Oklahoma Utilities Association, annual convention, Mayo Hotel, Tulsa, Okla.

March 12 — Pennsylvania Street Railway Association, annual meeting, William Penn Hotel, Pittsburgh, Pa.

March 17-18—Central Electric Traffic Association, Portage Hotel, Akron, Ohio.

March 17-18—Illinois Electric Railways Association, Illinois State Electric Association and Illinois Gas Association, annual joint convention, Springfield, Ill.

March 23-25—National Conference on Street and Highway Safety, Washington, D. C.

April 13-16—Southwestern Public Service Association, Galveston, Tex.

June 2-4—Canadian Electric Railway Association, annual convention, Quebec, Canada.

June 28-July 2 — Central Electric Railway Association, summer meeting, S. S. South American, Buffalo, N. Y., to Chicago, Ill.

Oct. 4-8—American Electric Railway Association, annual convention, location not yet determined.

Track Saturation Problem in Detroit*

By Col. H. U. Wallace
General Manager Department of Street Railways, City of Detroit

DETROIT has much in common with other large cities in its transportation problems, but it also has many problems which are peculiar to itself and are perhaps unique in the urban traction field. The intensive industrial life of the city not only lengthens the peak periods but increases the customary two periods to three distinct periods, with some three or four semi-peak hours in the intervals.

The city extends along the north bank of the Detroit River for a distance of approximately 12 miles and is solidly built up from the river in a generally northwesterly direction to a depth of about 9 miles. It is nearly rectangular in shape. The business center is on the city's southerly edge, approximately in the center of its river frontage, extending about ¾ mile along the riverfront and about the same distance inland.

One line of railroads enters the city in the southwesterly corner and extends diagonally across it from the business center. A second line of railroads extends from the westerly limits of the city, running southeasterly in a diagonal line to the business center. In addition to these, a belt line extends around the city approximately 6 miles from the center. Naturally the manufacturing district follows very closely along these railroads, which brings this district in an approximate semi-circle 3 miles from the business section, while some of the larger plants lie in a circle from 5 to 6 miles from the center of the city.

Our traffic surveys indicate that the majority of our people live on the side of the city opposite to which they work; that is, people engaged in plants on the westerly side of the city live on the easterly side, and vice versa, thus making it necessary for them to travel across the city to get to their work.

Many of the industrial plants work either two or three eight-hour shifts

*Abstract of a paper presented at twelfth annual conference on highway engineering, Ann Arbor, Mich., Feb. 17.

per day, employing thousands of men. There are probably very few railway systems in the world outside of Detroit that have a peak hour between 11 p.m. and 1 a.m. This peak is followed by the usual morning peak period from 6 to 9 to the business and industrial centers, and another in the afternoon from 3 to 6 o'clock. Since the starting time of these eight-hour shifts in our various industrial plants is not standardized, we find several periods which may well be termed semi-peaks. This lack of standardization, however, is helpful to the department, since if the hours were standardized we would require a tremendous increase in our rolling equipment to handle the armies of men who would pour into the streets.

While the transportation given by the department is fundamentally electric car service, a co-ordinated coach service is being developed rapidly. The growth and expansion of the city has made it imperative that we go into the coach business to serve newly populated areas on the outer edges of the city where the density of population is sufficient to warrant organized transportation but does not warrant the heavy investment incident to the construction of rail lines.

Coach lines run generally as extensions to the car lines in territory not directly served by the street car. Others are laid out as belt lines through newly developed territory intersecting existing car lines, thus giving a similar service through the transfer to that maintained where the car lines exist. This co-ordinated service works out to the benefit of the city, since the patrons originating their ride on a coach line can transfer, without additional cost, to a car line, and then, upon payment of 1 cent, can obtain a transfer to other existing car lines in the city.

The great expansion of the city demands some form of rapid transit. This may be rendered in two ways: First, of course, by a system of subways or elevated lines, or by a co-ordinated express and local street car and coach service. We are studying at the present time plans for such a co-ordinated service. These plans, which are still very much in the laboratory stage, would provide an express service by running street cars with stops approximately 1 mile apart. This service would be supplemented with a local coach service, or the reverse might be carried out with the coach in the capacity of an express.

One of the advantages of having the local service given by coaches is the ability of the coach to load and unload at the curb, thus avoiding a delay in the general flow of traffic, at the same time protecting passengers from the necessity of crossing through the traffic line to the center of the street to board the cars. The matter of protecting passengers either leaving or intending to board the cars is a serious problem because of the many unusually wide thoroughfares in Detroit. We have several streets of 100-ft. width and our main east and west artery, Jefferson Avenue, is 120 ft. wide. It will be seen from this that the distance from the curb to the car tracks is equal to the width of the average street.

Since, from necessity, the street car stops should be at intersecting street car lines, which means that usually these stops would be where the main traffic on the highway would also stop, there would be an advantage in having the street cars make only such stops, and if a substantial saving in time is made by these express cars, it is not inconceivable that local passengers would transfer from local coaches to the express street cars at these stops in order to get to the center of the city more rapidly.

Such a co-ordinated local coach and express car service would naturally be given only in the more densely populated areas. In other words, the coach routes would terminate approximately 4 miles from the center of the city, at which point the street cars would take up the local schedule to the end of the line. Studies of this co-ordinated service which have been made by this department indicate that on the longer lines reaching into the outlying sections a saving of ten minutes can be made in the run from the center of the city to the terminus of the line.

Since the city is paying for the railway system and its operating costs from the fares received and from no other source, one of the questions which must be answered is whether a line of coaches as outlined above would serve as a feeder to the car lines or act as a competitor, thus cutting down income and defeating the plan of purchase and operation. The studies made so far, however, indicate that the business is sufficient to warrant both classes of service, particularly since the service would be so attractive that competing privately owned jitney and bus companies will be forced out of business. It appears that this may be the solution for the present problem of tract saturation.

Oklahoma Utilities Speakers Announced

PROMINENT men in the different branches of the public utilities field have been selected to speak before the eighth annual convention of the Oklahoma Utilities Association to be held in the Mayo Hotel, Tulsa, Okla., March 9-11. Among those listed on the program are R. B. Campbell, president Midwest Electric Railway Association; Thomas F. Kennedy, member of executive committee H. L. Doherty & Company, New York City; J. E. Davidson, president National Electric Light Association; F. B. MacKinnon, president United States Independent Telephone Association; E. P. Dillon, general manager Research Corporation, New York City; Gen. Charles Keller, Byllesby Engineering & Management Corporation, Chicago; J. W. Gleed, general attorney Southwestern Bell Telephone Company, St. Louis; A. W. Leonard, president Natural Gas Association of America, Tulsa, Okla., and R. H. Sniffin, manager power department, Westinghouse company.

In addition to the general sessions, there will be division meetings for the electric railway, public relations, electric, gas and telephone sections. Ample opportunity for discussion will be afforded on the program.

Central Traffic Meeting

ON MARCH 17 and 18 the Central Electric Traffic Association will hold its next regular meeting at the Portage Hotel, Akron, Ohio.

The morning session on March 17 will be in the nature of a round-table discussion. The afternoon session will be given over to the transaction of committee work. It is the desire of the association, however, that so far as possible all committee work may be completed before the meeting in order to give more time to the transaction of business at the meeting. The session of March 18 will be devoted to reports of committees and such other business as may properly be presented.

American Association News

Mr. Trigg Proposed for Director of Chamber of Commerce

IN A LETTER addressed to member railway companies of the American Electric Railway Association, Executive Secretary J. W. Welsh calls attention to the coming election for directors of the United States Chamber of Commerce, which will be held at the annual meeting in Washington on May 11 to 13. He states that the industry's support has been asked for the election of Ernest T. Trigg, president and general manager of John Lucas Company, Philadelphia, Pa., who is a candidate for re-election from the second district. It is suggested that members communicate with their local Chambers of Commerce and also with any other organization members of the United States Chamber of Commerce in an endeavor to enlist their support in the above election.

Mr. Trigg has been connected with his firm since 1908. He has been general manager since 1912 and was elected president in 1922. He has been on many important boards and commissions of a public character, and was twice president of the Philadelphia Chamber of Commerce. Mr. Trigg is a director of the Philadelphia Rapid Transit Company and the Philadelphia Belt Line Railroad.

Metropolitan Section of the A.E.R.A. Meets March 5

FURNISHING transportation will be the subject of the next meeting of the Metropolitan Section of the American Electric Railway Association. W. B. Wheeler, assistant superintendent of transportation Third Avenue Railway, will present a paper on this subject. It will be discussed by M. J. O'Connor, superintendent of transportation New York Railways, S. S. Hamilton, assistant superintendent of transportation Brooklyn City Railroad, and D. K. O'Rourke, trainmaster Interborough Rapid Transit Company. Entertainment will be supplied by a well-known saxophone quartet from Connecticut.

Maintenance of Equipment

Right-Turn Signals at Louisville

IN ORDER to avert collisions caused by automobilists while attempting to pass to the right of a car when that car is turning into a street to the right, the Louisville Railway, Louisville, Ky., has installed right-turn signals. Similar signals have been installed at other points where cars are likely to back on the main line and create a condition where vehicles should not approach too closely. The equipments were furnished by the Nachod and United States Signal Company and include a red projector, a floodlighted sign, a clearing contactor in the trolley wire and a relay in a box mounted on a pole.

Signals in Connection with Floodlighted Signs Warn Motorists When Cars Are to Take a Turn. At Left, Pole Mounting for Sign. At Right, Pipe Bracket Mounting

When used in connection with a Cheatham switch, the same operation of the car under the Cheatham contactor that throws the switch-point for the diverging route shunts out a relay in a normally closed circuit. This causes its armature to drop to a back contact, closing a circuit to illuminate the red projector and to floodlight a sign reading "Car Turns." The projector is equipped with a 50-watt lamp in a 9-in. parabolic glass reflector with red cover glass and makes a brilliant effect even in daylight. The floodlight reflector has a 50-watt lamp also in series with the projector. This display of signals not only gives an arrestive warning, but explains the reason for it.

After the car has made the turn, it passes under a normally open contactor of the short type, which picks up the "stick" relay again, and thus removes the indication. The railway has installed six of these in various parts of the city. One is used to give warning that a car is about to back over a piece of double track while wye-ing; in this case the sign reads "Car Backs." It is controlled by two independent contactors. Another is placed where the car line swings across the street to make a terminal loop. One illustration shows the outfit mounted on 1½-in. pipe bracket, extending from the pole with sign and projector at the outer end of the bracket. The other shows a sign and projector mounted against the pole.

Fixture for Edgewise Bending of Rings

FINISHING rings for flush type headlights are made of ¾-in. flat stock ⅛ in. thick in the shops of the Eighth Avenue Railroad, New York, N. Y. The rings are formed by bending the stock edgewise in a special fixture, which is shown in the accompanying illustration. The fixture has a central portion, around which the bending takes place. A slot in this central ring keeps the stock in place and prevents it from turning up. A clamp to hold the end of the stock is pivoted from the central part of the ring, and the forming arm has rollers, with a groove to hold the edge of the flat strip. These roll the ring into position. This forming arm is also pivoted from the central part of the ring.

Fixture Used to Form Headlight Finishing Rings from Flat Stock. A Finished Ring Is Shown in the Background

To form a ring, the stock is heated so that it will bend readily, and the end is then placed in position and held firmly by the clamp of the fixture. By rotating the arm, the rollers force the flat stock into the groove of the central ring of the fixture and so bend it into circular shape. After the rings are formed, the ends are scarfed and welded by a blow from a hammer.

Changeable Sign for Front and Rear Entrance

DURING rush hours cars of the United Electric Railways, Providence, R. I., are operated with two men, but at other times many one-man cars are in operation. Passengers may board cars at the rear end with two-man operation, but must, of course, enter at the front of

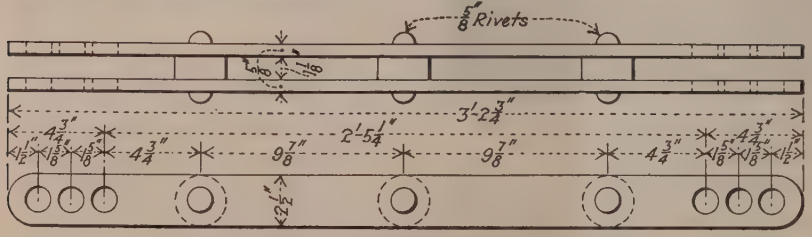
one-man cars. It was thought desirable, therefore, to install a sign to tell passengers at which end to board the car. Immediately below the destination sign in the front vestibule window a translucent sign has been installed. One end reads "Enter Front" and the other side reads "Enter Rear." A movable metal slide can be so placed that either end of the sign is concealed. Thus it can be made to read simply "Enter Front" for one-man operation or "Enter Front or Enter Rear" for pay-leave, two-man operation or "Enter Rear" for pay-enter, two-man operation. The sign itself consists of a piece of cloth spread on a metal frame attached to the window posts. The light of the car body is sufficient to make the sign readable from the street at night.

Maintenance Practices of Union Street Railway, New Bedford

Dead Lever Guide Aids Brake Adjustment

IN ORDER to insure proper braking at all times, the Union Street Railway, New Bedford, Mass., uses a somewhat novel brake-adjusting device. A piece of ½-in. steel 36 in. long and 3 in. wide is bent U-shaped and bolted to the truck bolster. Through this U-shaped piece of steel two or three rows of ⅝-in. holes are drilled. There are usually eight or ten holes in a row and they are so aligned that they provide a 7/16-in. distance between holes, thus permitting a 7/16-in. take-up of the brakes. The dead lever arm is passed through the center of this U-shaped dead lever guide and is held in position by means of a steel pin that is passed through a pair of these drilled holes. Adjustment for brake shoe and wheel wear can readily be made. The spreader arm which extends between the live and dead lever arms is provided with three bolt holes to take care of the adjustment made necessary when equipping the car with new or turned down wheels. G. H. Bonner, shop foreman, was the originator of this device. Details are shown in accompanying drawings.

Cars of this system have been placed on a systematic inspection basis by use of the Sangamo Economy power-saving meters. The meters are equipped with inspection dials to determine when cars should be inspected or overhauled. When a car has operated approximately 750 miles it is given a brake inspection. This has been found frequent enough to keep a car which is provided with this brake-adjusting device in proper braking condition at all times.



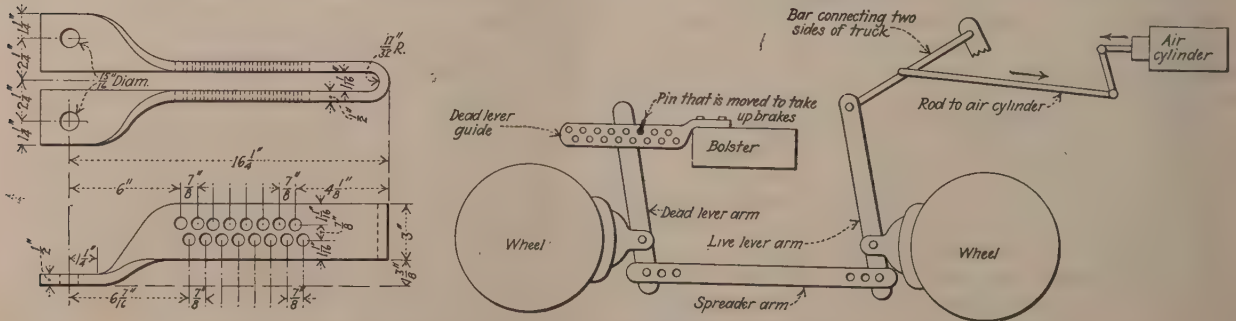
Spreader Arm Used Between Live and Dead Levers

Journal Box Shims Save Wear

AS A means of holding the journal box housings in their proper place the Union Street Railway, New Bedford, Mass., makes a practice of placing steel shims between the journal box housing and the truck frame.

Shims Bolted to the Truck Frame Save Wear on the Journal Box on Cars of the Union Street Railway

A through bolt at the bottom of the truck frame holds these shims in a vertical position, while side motion is prevented by the presence of the journal box housing on one side and the bolt heads of the truck frame on the other side. As these shims are of softer metal than the journal box housings they absorb whatever wear there is and thus leave the truck frames and journal box housings in their original condition. Ordinarily shims ¼ in. thick are used, but in exceptional instances a ⅜-in. shim is installed. The surfaces of these shims are kept lubricated by applying old crank case automobile oil. Use of these shims has almost eliminated the breaking of truck and journal box parts and has resulted in holding the frame, journal, axle bear-

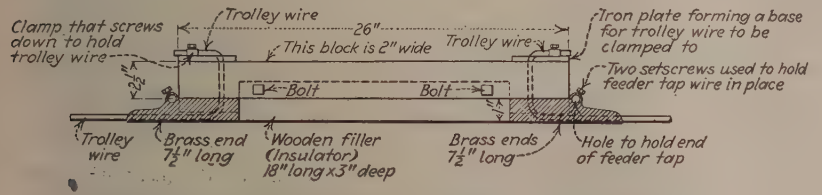


At Left—Detail of Dead Lever Guide. At Right—Brake-Adjusting Device Used on Cars of the Union Street Railway, New Bedford

ing and wheel in proper alignment. This has necessarily aided in eliminating worn journal box bearings, worn axle heads and grooved truck and journal box housings.

Long Section Insulator Used by Union Street Railway

A 26-IN. wood section insulator designed by Peter Dupuis, line foreman, is used by the Union Street Railway, New Bedford, Mass. It has an oak filler 18 in. long, which makes a positive breaking of the current. This filler is driven into a slot in the breaker and is held firmly in position by two through bolts. The brass approaches are


Clamp that screws down to hold trolley wire
Trolley wire
26"
This block is 2" wide
Trolley wire
Iron plate forming a base for trolley wire to be clamped to
Two setscrews used to hold feeder tap wire in place
Bolt
Bolt
Trolley wire
Brass end 7½" long
Wooden filler (Insulator) 18" long x 3" deep
Brass ends 7½" long
Hole to hold end of feeder tap

Section Insulator Designed to Prevent Damage to Ends of Trolley Wire

7½ in. long and are ordinary except for the special device for holding the ends of the feeder wires. These are not soldered, but are held in a socket provided with two setscrews. This method insures proper contact and at the same time the feeder wires can be easily removed. The ends of the trolley wire are passed through a gradual curve on the ends of the breaker and firmly held on the top of the breaker by means of an iron plate equipped with an iron clamp provided with two bolts. This method avoids damaging the ends of the trolley wire. Another advantage of this type of breaker is that the ends of the trolley wire are of sufficient length so that they are held in such a position that a maximum of strength is obtained.

Special Work Made by Thermit Welding

SEVERAL simple pieces of special work have been made in the Rochester shops of the New York State Railways by using their new thermit welding outfit. In this work, measurements of the old frogs which are to be replaced are taken in the ground by the railway engineering department. A sketch is made up from these measurements, and the work is done in the blacksmith shop under the direction of Louis Kubiak. The accompanying illustration shows two frogs being constructed. These are made in one piece to avoid joints. The guard rail is cut to the proper length and is then bent to the radius desired. The rails are fitted together and a slight space is left between the rails of the central points where the welding is done. After the work is set up, measurements are checked against the drawings before the pieces are finally bolted down to timbers for the welding operation.

A mold constructed in standard manner is placed around the point where the thermit metal is to be deposited, and a crucible is set over the junction of the rails. The thermit welding is done in the usual manner. The illustration shows the metal as freshly deposited at one of the frog points of the double frog being made. The sand about the mold has been removed. After the metal is cooled properly, it is ground to a smooth surface at the top and the proper groove is ground to permit the passage of wheel flanges.

The cost of constructing special work as indicated is much less than what would be required to buy the pieces from manufacturers, but of course these frogs will not last as long, as they contain no solid manganese points to take the excessive wear at the centers.

Two Special Work Frogs Set Up for Welding in the Rochester Shops of the New York State Railways

Discarded Headlights for Indirect Park Lighting

SOME 18 miles north of Toronto, along the main highway and the route of the Toronto & York division of the Hydro-Electric Railways, lies a fine pleasure resort comprising a lake of more than 50 acres and another 165 acres of adjacent beach and woodland. When this park was in the hands of the original Toronto & York Radial Railway it was operated directly by the railway at a substantial loss. Under the Hydro-Electric Commission, however, the grounds have been turned over to a professional amusement concern, with the result that the railways are in a fair way to be relieved not only of the former operating expense, but of interest on the investment as well. This desirable end will be aided by a housing development scheme whereby cottage builders will be able to secure lots at a distance of only 300 ft. from the lake, their homes being made accessible by a 30-ft. roadway to be built at the rear of the cottages and going round the lake.

One of the features that has helped to popularize the park is a novel and economical scheme of indirect illumination. At the lake end nearest the highway is a power house and plenty of shrubbery. Concealed in this shrubbery is a battery of discarded arc headlights. These headlights produce illumination similar to that of a monster searchlight of an excursion steamer and of course attract the favorable attention of the thousands of travelers on the main highway near by. As the power used is entirely off-peak, the principal cost is for replenishing carbons.

The News of the Industry

Wage Change in San Francisco

The Market Street Railway employees of San Francisco, Cal., have received a voluntary wage increase of 2 cents an hour, effective Feb. 28, while the San Francisco supervisors have just denied more pay to the employees of the Municipal Railway. Under the new scale Market Street Railway employees will receive 56 cents an hour. Commensurate increases were given in all other departments, including shops, substations and track repair men. Samuel Kahn, executive vice-president of the road, said that the raise was entirely voluntary on the part of the management and would cost the company about $200,000 annually. About 2,500 men are affected. This action followed shortly after similar action by the California Street Cable Company. It is in line with the policy of restoring wages to the pre-war maximum.

The decision of the supervisors denying Municipal Railway employees an increase in wages from the present scale of 67½ cents to 75 cents an hour was attended by a series of bitter attacks by representatives of the men. The combined finance and public utilities committees of the San Francisco Board of Supervisors said, in effect, that it wanted to give the raise but it could not find the money for the purpose. The spokesmen for the employees said the money should be found even if a 6-cent fare were necessary.

It was agreed by the committees that there was at hand a sum amounting to $343,000 which might be used to pay the wage increase demanded, but they also pointed out that this would last for only two years and that afterward there would be an annual deficit. Expert accountants retained by the employees declared that the figures quoted by the supervisors were obtained through erroneous bookkeeping methods and that there was money enough to meet the increase. They urged rectification of the accounting system. In the end it was agreed that there must be some changes in the financing before any pay increase could be recommended.

Committee to Study Atlanta's Needs

Mayor Sims of Atlanta, Ga., following a councilmanic resolution, has named a new committee to consider the "relief petition" of the Georgia Railway & Power Company. The petition of the company was filed early in December and suggested seven different remedies of relief. One of these, the elimination of jitney buses from the streets, has already been granted, and another, that of eliminating certain unnecessary street car stops, has been recommended by the Council and is now before the Public Service Commission for action. The other suggested remedies are: Elimination, to the extent necessary, of the gross receipts tax and street paving assessments; 10 cents for cash fares, with a special rate for riders who use tickets, and a 2-cent charge for transfers.

Railway and Bus Company Unite in Bid

New York City Companies Would Abandon 25 Miles of Track and Run 50 Miles of Bus Routes at Five-Cent and Ten-Cent Fares with Transfers on Latter

AN EXCLUSIVE franchise to operate an extensive bus system in Manhattan on which 5 cents would be charged on crosstown lines and 10 cents on longitudinal lines was sought in a joint petition presented on Feb. 24 to the Secretary of the Board of Estimate of New York City by the Fifth Avenue Bus Company and the New York Railways. The two companies announced an amalgamation for the purpose of bus operation and offered in return for the franchise to eliminate 25 miles of street car tracks, remove 200 cars and to give up perpetual franchises owned by the railways.

A summary of the main points of the new petition, follows:

(a) Marks first move toward the installation of a comprehensive motor coach service through co-operation of effort and co-ordination of facilities of existing surface car companies.

(b) Discontinuance of the use of 25 miles of street car tracks.

(c) Surrender of perpetual franchises to operate street cars on those tracks.

(d) Removal of over 200 street cars from the congested city streets.

(e) Operation of ten crosstown motor coach lines—23.96 miles of route—for a 5-cent fare.

(f) Operation of three longitudinal motor coach lines—24.58 miles of route—at a 10-cent fare.

(g) A universal transfer system, under which by means of transfer and retransfer for a single fare of 10 cents a person may ride from any point on the system to any other point thereon.

(h) A modern motor coach system covering about 50 miles of routes in Manhattan.

(i) Service to be started at once on certain lines and full service to be in operation in 90 days on the remainder of the system.

(j) Provision made for recapture by the city after five years for the purpose of municipal ownership and operation.

(k) Efficiency of service guaranteed by a staff of men experienced in omnibus operation and familiar with local transportation conditions in Manhattan.

Through John A. Ritchie of the Fifth Avenue Coach Company as spokesman, it was disclosed that controlling interests of that corporation and of the New York Railways had effected the amalgamation through the formation of a company just incorporated as the New York City Omnibus Corporation, of which Mr. Ritchie is president and J. M. McCarthy secretary.

The consolidated company withdrew the previous applications made by the Fifth Avenue Coach Company and the New York Railways and submitted its new joint plan, which calls for a virtual monopoly of bus operation in Manhatton with extensions into the Bronx.

The corporation also makes provision for recapture in the interest of municipal operation by the city after five years of private operation, if the city should so elect.

A statement by the sponsors for the new application concerning their proposal follows:

Under this plan presented by the New York City Omnibus Corporation, headed by John A. Ritchie, the new system can be put into immediate operation, first, because the new corporation has available the unique facilities of the Fifth Avenue Coach Company, including buses, equipment, personnel and organization, to put such a system into immediate operation, and, second, because all danger of litigation between the interests involved would be at once eliminated, and the city would, moreover, without expenditure, regain control of many of the streets, its use of which is now restricted by existing perpetual franchise grants.

Traffic all through the Borough of Manhattan would be vastly speeded up; congestion due to unnecessary duplication of routes would be eliminated, and the transit facilities of the borough would be placed in a more plastic state, whereby the city would mold them more nearly to meet the needs of the changing conditions.

The new company proposes that as soon as practical other street car lines of the New York Railways shall be motorized and the street-car tracks taken out. The ultimate object of the new company is to extend this plan to all street-car operation in Manhattan when and as soon as possible and practicable.

Sixth, Seventh and Columbus Avenue, three of the traffic arteries, would be immediately freed of street-car tracks under the plan, and Eighth Street and 116th Street for the most part would be immediately similarly cleared of inflexible street railway lines.

The crosstown routes, ten in number, would be operated at a 5-cent fare. The longitudinal lines would be operated at a 10-cent fare. Free transfers would be issued from the 10-cent lines to the 5-cent lines and to the other 10-cent lines, and a 5-cent transfer would be sold on the 5-cent lines for use on the 10-cent lines. The transfer privilege would allow a person by use of a transfer and retransfer to ride from any point on the system to any other point on the system for a single fare of

10 cents. This is the most comprehensive transfer arrangement which has been submitted with the proposals for bus operation in the Borough of Manhattan.

The proposal provides for the recapture by the city for municipal operation after five years at a valuation to be agreed upon by arbitration.

The routes proposed not only include substantially all of those laid out by the City Board of Transportation, but also additional routes provided for by the surrender of part of the perpetual franchise routes of the New York Railways—that is, Sixth, Seventh and Columbus Avenues and other thoroughfares. Service on some of these routes can be started immediately and the entire system can be completed and placed in operation within ninety days.

Approximately 200 surface cars would be eliminated by the plan and the passenger-carrying capacity of the borough's surface lines would be increased vastly by the installation of 210 double-deck and 202 single-deck motor coaches on the superseded electric lines and the additional new lines contemplated, which buses would be of the finest and most modern type and practically noiseless.

Consideration was given in the plan of the system to the elimination of inconveniences of unnecessary transferring by making provisions for the through routing of vehicles between extreme points in the borough at a maximum cost of 10 cents to the passenger.

The most of the afternoon of Feb. 24 was devoted to conferences with representatives of three of the principal competing bidders for bus franchises in Manhattan and to a general study of the terms and conditions offered in their respective petitions. The three applicants were the Service Bus Corporation, the Fifth Avenue Coach Company and the People's Electrobus Corporation.

It is said that the Fifth Avenue Coach Company also plans to combine a new bid with that of the Third Avenue Railroad subsidiary in the Bronx and may file a joint supplemental petition for the Bronx. The Third Avenue bus subsidiary is known as the Surface Transportation Company. The Third Avenue Railway now enjoys the greater part of all the road surface transportation in the Bronx.

Mayor Walker said on Feb. 25 that no action on the application of the New York City Omnibus Corporation could be taken until after consideration of the other applications for bus franchises and after the statutory hearings on the petitions yet unheard. The Board of Estimate fixed March 11 to hear the omnibus corporation.

Jersey Paving Bill Laid Over

After a fight in the Legislature, Senator Frank D. Abell of Morristown was compelled on Feb. 23 to lay over his bill to relieve street railway companies from paving obligations. On three roll calls he was able to get only ten of the eleven votes necessary for the passage. Although several Senators joined in the debate against the measure, Simpson of Hudson County and Roberts of Burlington County were the only ones to vote in the negative, the others remaining silent as their names were called.

Senator Abell said that the obligations originally assumed by the traction companies had become obsolete, and he charged that it was unfair to continue to compel them to help keep up the roads used by competing jitneys and motor buses. He declared that the Morris County Traction Company was in bankruptcy and that unless relief were granted trolley service would be lost to the working people. He argued that eight states have relieved trolley companies of such obligations.

Senator Simpson led the attack on the bill. He said that the utility companies, in order to obtain their valuable franchises, had agreed to certain things that they were now finding expensive and that if they were allowed to escape the burden it would have to be borne by the municipalities. He said in the next six years it would cost Jersey City $2,500,000 and Hoboken would have to pay several hundred thousand dollars on paving that had been neglected by the Public Service Railway.

New Deal Suggested for Worcester

Special Committee Named by Mayor to Investigate City's Street Railway Needs Favors Transportation Monopoly as Best Policy, with One Company Operating Trolleys and Buses

THE entire passenger traffic of the city of Worcester, Mass., should be handled by the Worcester Consolidated Street Railway, whether by trolley cars or buses used in conjunction with the trolley cars. Changes should be made in the regulation of the routing of buses so used, so that every emergency of traffic might be met with the least inconvenience. These are the principal recommendations submitted to Mayor O'Hara by the special commission appointed to investigate.

Among the most vital needs are given the speeding up of the trolley service in the city, provide new and up-to-date cars equipped with proper safety devices, that will permit the company to meet the new conditions that have come with the fast-moving automobile competition. At present the average speed of trolleys is a trifle more than 8 m.p.h.

An interesting feature of the report is the finding, based upon an actual count of passengers carried at the busy hours in Worcester, that buses cannot take the place of trolleys, but only aid in the carrying of traffic because the streets could not accommodate sufficient buses to handle the problem.

The report was drafted by Prof. Albert S. Richey of Worcester Polytechnic Institute and was adopted by the full committee, which included Frank H. Willard, City Solicitor William C. Mellish, William J. Flickinger for the New Haven Railroad, Clark V. Wood, president of the Worcester Consolidated Street Railway.

The report came as a result of the study made by the special commission of Worcester trolley needs, prompted by the appeal of the officials of the New York, New Haven & Hartford Railroad for co-operation from the city of Worcester in the effort of the railroad company to have legislation enacted at the State House that would permit the railroad to take back control of the trolley lines of the state, and on which the railroad officials in return promised to expend large sums of money in rehabilitation. Worcester was slated to have $1,000,000 of the proposed amount to be so expended in improving the service, and more if needed.

Professor Richey says the competition of the privately owned automobile has very seriously reduced the patronage of the railway in Worcester, as it has in every other comparable city of the country. It is believed, however, that with the proper rehabilitation of the railway, including the substitution of a considerable number of comfortable, convenient, attractive, and thoroughly modern cars, and especially if some improvement can be made in operating speed, a great deal of this lost patronage can be regained.

Among other things the report as presented says:

One of the most vital factors entering into proper street railway transportation is speed, and there should be a proper co-operation by the city officials toward its attainment. There is no question but that the larger part of the traveling public is served by the street cars, or that the street car is by far the most economical user of street space. Both of these facts are demonstrated by counts made within the past two weeks and referred to later, herein. Any steps taken to expedite the movement of street cars are for the general good of the entire city.

The company owns about 168 closed cars, most of which are less than 20 years old, and which are suitable for present service, with the exception of 25 cars which have been remodeled from open cars, have high platform, two steps and narrow doors, and which for those reasons unduly slow up service and consequently should be retired. This leaves about 145 closed cars which I agree with Mr. Wood are suitable for present operation, and deducting this number from the requirement of 220, Mr. Wood arrives at his number of 77 new cars to be purchased. He speaks of the proposed new cars as "lightweight one-man two-man cars," which agrees with the Day & Zimmermann statement as to a suitable type of car for this property, and with which I also agree, except that in the light of recent experience elsewhere, I believe practically the entire operation can be with one man, especially if the cars are designed to facilitate the movement of passengers and the collection of fares, including such devices as the treadle-operated rear exit door.

Equipment Should Be Overhauled

The purchase of new cars should be accompanied by a complete overhauling and repainting of all of the existing equipment which is retained in the service, and the future policy should and of course will include that of good housekeeping to the extent that cars are kept well painted, clean, safe and comfortable in operation, and manned by operators who at all times consider themselves as enthusiastic salesmen of a proper transportation service as much as the servants of the public as though in its direct employ.

The additional bus service suggested by Mr. Wood in substitution for railway service on the Worcester & Webster and Webster & Dudley lines and the Blackstone Valley division, south of Millbury, are matters which are most important to the city of Worcester. Such lines as these can be served best by bus, and in my opinion such substitution should be made.

Within the city of Worcester, it is doubtful if there is any section which at present is not served properly either by street cars or buses, but the street railway should be ready to provide one service or the other as soon as the need for it is demonstrated, and it is shown that a reasonable patronage is ready for the service.

With traffic which requires as does Park Avenue operation the use of street cars as frequently as 22 in a period of 1½ hours, there can be no question but that such operation is much more economical than would be that of buses, even if there were street room for the latter.

Relative to the reconstruction of various tracks in the city comprising about 34,000 feet of track in twelve locations, there is no question but that a proper rehabilitation of the railway would include such reconstruction. The railway should co-operate with the city in connection with all track reconstruction, to the end that where such reconstruction is necessary and the street is to be rebuilt, the work be done simultaneously, and at such time as

the city is ready to proceed with its work. In connection with track reconstruction and betterment, automatic electric switches should be installed at all points where track switches require movement in the operation of one-man cars.

In order to determine the relative use of the street by automobile and street car, I arranged for counts to be taken on South Main Street at Wellington Street, on Jan. 26, 1926. All outbound traffic was listed during the period between 4 and 6:30 p.m., and during that period the following outbound traffic was noted:

Six hundred and ninety-four private automobiles, with 1,144 passengers.

One hundred and thirty automobile trucks, with 196 passengers.

Twenty-two taxicabs, with 41 passengers.

Eight hundred and forty-six total automobiles, with 1,381 passengers.

Seventy-one street cars, with 3,127 passengers.

Professor Richey says it is probable that this count represents a fair cross-section of all cars and riding persons leaving the downtown section in all directions. He directs attention to the fact that although less than 8 per cent of the vehicles were street cars, they handled 70 per cent of the persons; also that the average number of passengers per automobile was 1.63, while the average number of passengers per street car was 44. He says that when it is considered that the street car occupies no more street space than two automobiles, the remarkable efficiency of street cars as a transportation agency as compared with the automobile is manifest, together with the fact that it is handling many more than double the number of passengers traveling by all other agencies. True, the above observations were taken wholly within the rush hour, but Prof. Richey says it must be remembered that this is the time during which the traffic problem is most serious.

School Regulations in Chicago Expedite Railway Travel

A step in curbing the exuberant youth in car loading at the high schools of Chicago, Ill., has been taken as a result of the ingenuity of the leaders of one school who devised and caused the adoption of regulations to get the students on their way home in orderly fashion. The regulations have been published as a model and are the product of Tilden Technical High School students. The school is one of a number at which several thousand students clamor for street car service, mostly at the same time. The regulations follow:

On each corner will be about four cadets with one senior cadet in charge. As soon as a car is available, one cadet will call the destination of the car, as, for instance, "Halsted and 79th." When the car is loaded a director will give signal for car to start. If there is a car superintendent present, he will give signal for the car to start.

Follow These Instructions

1. Line up in a single file parallel to the street car.
2. Do not get on the car while it is in motion.
3. Do not stand on the rear platform of the car unless it is impossible to enter the car.

Purpose of Regulations

Develop a well-regulated system of boarding street car and passing between periods which will:

1. Safeguard the lives of the students.
2. Save time.
3. Prevent congestion.
4. Give Tilden a good name.

Slogans

"Have fare ready"

"Line up" "Speed up"

"Move Along"

Goal

"To make the best better"

Willing to Surrender Massillon City Franchise

Heavy losses sustained in the operation of its city lines in Massillon have led the Northern Ohio Traction & Light Company to ask the Council of that city for permission to discontinue its city service. Such application has no bearing on the interurban service between Massillon and Uhrichsville on the south or Canton, Akron, Cleveland on the north.

The company does not desire to be placed in the attitude of attempting to evade its contract, and for that reason has hesitated to suggest an abandonment of the system to the City Council and citizens of Massillon. It develops, however, that a bus company has been organized with capital sufficient completely to motorize the city. In view of this, the company has expressed a desire to abandon its so-called city lines, leaving the interurban line through the city.

The company has felt for some time that the people of Massillon wanted a bus transportation system for the city, but it does not now desire to extend its bus operations to that extent, nor has it in the past desired to do so. The company which has proposed to put in a bus system is experienced in bus operation.

On its part, the Northern Ohio Traction & Light Company has offered to aid the city and applicant company to establish a permanent bus system. The company believes that in cities the size of Massillon a bus system can be operated which will be of greater benefit than the present rail system, and meet more adequately the needs of the public than does the railway. The company's present contract has only a few years to run. The lines have been operated year by year at considerable loss.

The proposal of the bus company, headed by Frank Booth, fixes a rate of fare at 8 cents cash, two tickets for 15 cents. It is intended to operate upon the principal streets of Massillon, and particularly to serve the steel mill district.

The application of the bus company and the one for abandonment will come before the Council on March 1.

$11,000,000 Milwaukee Budget

Approximately $11,000,000 will be spent by the Milwaukee Electric Railway & Light Company, Milwaukee, Wis., and its associated companies under the 1926 budget adopted at the annual meeting on Feb. 17. The program provides for these disbursements:

Milwaukee Electric Railway & Light Company, $6,100,000; Wisconsin Electric Power Company, which owns the Lakeside power plant, $2,300,000; Wisconsin Gas & Electric Company operating in Racine, Kenosha, Waukesha and other communities in southeastern Wisconsin, $1,600,000; Wisconsin Traction Light Heat & Power Company, operating in Appleton, $800,000; Badger Public Service Company, operating in Elkhart Lake and other Sheboygan County communities; Peninsular Power Company, operating in the northern peninsula of Michigan, and the Milwaukee Northern Railway, $200,000 among them.

The greatest single expenditure will be $2,300,000 for equipment to increase the output of the Lakeside pulverized fuel plant. Approximately $2,000,000 will be expended on the electric railways, exceeding by $600,000 the expenditure during 1925. About $1,000,000 will be required to complete the Waukesha interurban cut-off. Reconstruction of track in Milwaukee will require approximately $885,000.

New Problem in Jacksonville

In view of an adverse opinion from Austin Miller, city attorney, of Jacksonville, Fla., no referendum on the proposal that the city acquire by purchase and operate the Jacksonville Traction Company will be called by the City Commission, according to Frank H. Owen, chairman. The popular vote, which was requested by the City Council, was scheduled for April.

According to the opinion by Mr. Miller, it would be illegal for the city to spend public funds to determine "whether or not the city should do something it is not authorized to do by its charter." If any individual or group wants to press for a referendum, according to the opinion, it will be necessary to go to the Legislature for an act empowering the city to engage in street railway ownership.

So the Public of Baltimore May Know

The United Railways & Electric Company, Baltimore, Md., is conducting an advertising campaign through the Baltimore newspapers which gives the public intimate details of the street car system and how it is operated. Several of these advertisements have appeared.

The United takes the view that this advertising, if steadily and consistently presented, will greatly benefit the city, the patrons and the company.

The following benefits are listed:

A better understanding of the street car company's problems.

More street car riders and increased revenue for the company.

Better street car service.

A quickening of the city's progress, which is bound to be dependent upon the quality of its transportation facilities.

The company says:

Big improvements in street car service are expensive—more expensive now than ever. And yet rapid transit must grow and improve if the city is to grow and improve. In order to increase its capacity for improvement the company must increase its revenues. The sole source of a railway's revenue is its riders. Its income consists entirely of individual car fares. It cannot have more income until more Baltimore people ride the street cars. With increased riding and increased income there must come major improvements in service.

For years and years street car companies have been almost inarticulate. Other institutions, public and private, with problems to be solved and work to do have taken the public into their confidence and have asked their help and understanding. Street car men have worked in silence. Being in closer contact with the exacting and critical public than any other public utility they have leaned in the direction of taciturnity under fire. Work hard, take your medicine, keep quiet. That was the creed of the old time street car man.

It was a praiseworthy and creditable creed and it still is. But today "keep quiet" is a principle easily carried to extremes. The United intends to continue to live up to it. But it will amend the principle to this extent—it will not require the Baltimore public any longer to guess at the truth about its affairs or to accept misstatements in place of the truth.

These are the reasons for the United's advertising.

Franchise Memorandum on File at Louisville

A tentative memorandum regarding abolition of the present franchise and fare ordinance, under which the Louisville Railway, Louisville, Ky., now operates, and replacement of it with a new one, with a higher cash fare and slightly lower than present ticket fare, has been placed in the hands of Mayor A. A. Will. It is expected the memorandum will be made the basis on which something tangible may be worked out.

Experience seems to have proved that the present modified service-at-cost ordinance under which the company operates could well be modified in its provisions to the benefit of the city and the company.

News Notes

Metal Tokens in Use.—The Beech Grove Traction Corporation, connecting Indianapolis, Ind., and Beech Grove, has discontinued the sale of its five two-zone tickets for 50 cents and is now using metal tokens and Johnson fare boxes. The majority of patrons, it is said, prefer the metal tokens.

Seeks Increase in Fares.—The Union Traction Company, Coffeyville, Kan., has petitioned the Public Service Commission for an increase in its fares in the cities of Parsons, Cherryville, Independence and Coffeyville. The company requests a boost in local fares to 8 cents or two tickets for 15 cents, with a book fare of 25 rides for $1.65. The present rate is 6 cents with a 5-cent book fare. The case was set for hearing at Topeka March 1.

Books Extended to Fourteen Days.—The Public Service Commission has approved an amended local passenger tariff of the Geneva, Seneca Falls & Auburn Railroad, Inc., Seneca Falls, N. Y., changing the limit on 20 trip commutation ticket books from ten to fourteen consecutive working days. This amendment was effective Feb. 15 under special permission of the commission.

Metal Tokens Again in Louisville.—The Louisville Railway, Louisville, Ky., which has been issuing paper tokens since Feb. 1, has gone back to the metal tokens, following complaints of patrons. The tokens are the same as those previously used by the company. There is no saving for the consumers in buying tokens. They are sold at the rate of seven for 35 cents.

Higher Fares Discussed at Hearing.—The railway division of the Illinois Power Company, Springfield, Ill., is making less than 3½ per cent of its investment and last year fell $96,719 short of earning the 7 per cent return allowed by the State Commerce Commission, according to reports of accountants and engineers presented at a recent hearing. The increased fare proposed would retain the 10-cent cash fare, with tokens increased from four for 25 cents to seven for 50 cents and family fare books from $2 to $2.50 for strips of 40 tickets.

Foreign News

Bermuda to Have Electric Railway

Permission has been granted for the construction of a tramcar line in Bermuda, and it is planned to start work on it in the next few months. The ban has not yet been lifted on automobiles and motorcycles, so the single motor truck to carry freight remains the only representative of the automotive family.

"Antiquity, even in transportation facilities, is part of the stock in trade of Bermuda," says a bulletin from the Washington, D. C., headquarters of the National Geographic Society. "To the visitor this is one of the chief sources of its charm. There are no industries other than agriculture and catering to the tourist trade. The steamboat whistle and the clatter of horses' hoofs on the smooth hard roads are the only foreign noises that disturb the Sabbatical quiet of the island."

Plans Approved for Lisbon Subway

Concessions for the construction of a metropolitan subway in Lisbon, Portugal, has been granted by the Municipal Council of that city to a Spanish group. This concession comprises eight lines radiating from the Rocio Square over a total area of about 16½ miles. The hilly nature of the city will necessitate deep construction, but stations will be near to the surface and elevators need not be installed.

Vignole rails, 59½ ft. long with fish plates and weighing 90 lb. per yard, will be used, with a gage of 4.72 ft.

It is planned to build this subway in eight sections, each costing approximately $2,250,000. The Spanish engineers are now seeking an initial loan of foreign capital in the amount of $200,000 to defray the expenses of the first section built. It is proposed to finance the successive sections by capital flotations and local loans in Spain and Portugal.

National Electric Scheme for Great Britain

The general electricity supply plan which the British government is contemplating has some interest in the realm of electric traction, because if it is carried out many small power stations will be closed and energy taken from great economical stations.

The three main features of the new government scheme are large generating stations, a national board and distributing stations. The generating stations are to number about 60. The electricity produced by them is to be purchased by the board and sold to the distributing stations. Interconnecting power lines will be established by the board between the generating and distributing stations. Many small power stations will disappear. To allow interconnection between generating stations, it is proposed that a standard frequency of 50 cycles per second should be set up for the whole country. Cheap and abundant supply for all purposes is the goal, but it is recognized that a good many years must elapse before much benefit can accrue.

Many municipalities which have power stations and the steam railway companies which contemplate electrification will probably oppose the plan. If the plan is successful, many of the smaller tramway undertakings in the country should benefit from having a power supply from the national mains at a cheaper rate than they can produce for themselves.

Underground Railways for Manchester.—Proposals for the construction of underground electric tube railways in Manchester, England, are again being revived. The plan is for a circle railway with a central station, from which radiating lines would be constructed to the outside areas. The estimated cost is from £250,000 to £300,000 per mile.

Liverpool to Purchase Tramway System.—Purchase of the Waterloo & Great Crosby tramway undertaking has been decided upon by the Liverpool, England, City Council. This railway has been operated by the Liverpool Overhead Railway, but its lease on the lines will soon expire.

Electrification Planned in Czechoslovakia.—Contracts were placed recently for the first electrifying project of the Czechoslovakian State Railways. This comprises the electrification of the Prague railway stations and the connecting lines. A considerable part of this contract work has been placed with the Skoda Works, whose special department for electric railways has developed into the largest and most modern undertaking of its kind in Czechoslovakia.

Electric Train Test in Sweden.—Successful trial runs with electric goods trains took place recently on the Moholm-Falkoping section of the line between Stockholm and Gothenburg, Sweden, the electrification of which will soon be completed. Four trains were dispatched simultaneously in each direction, the longest consisting of 50 trucks. A fully loaded train maintained a speed of 37½ m.p.h., even on the steep grades on the line.

Trackless Trolley in Darlington.—Inauguration of the trackless trolley system in place of the tramways in Darlington, England, is now taking place. This is a complete substitution. The financial position of the municipal tramways would not permit the extensive renewals required. This tramway system was opened in 1904 and has never been financially successful. The type of trolley bus adopted is a single-deck, 31-passenger vehicle with a central door. The interior is divided into two compartments, one being used as a smoker.

Recent Bus Developments

Plan at Buffalo Collapses—Railway Renews Offer

Plans of Ernest M. Howe, Detroit, and the American National Omnibus Corporation, New York, to establish 5-cent bus service in Buffalo over thirteen routes covering 71.5 miles of streets have collapsed following the failure of the company to complete its financing arrangements as ordered by the Public Service Commission. The company lacked $300,000 of the necessary $1,500,000 paid-in capital on the last day allowed by the state utilities board to complete its financing and appear before the commission for a hearing on its application for a permit.

With the announcement that the Howe plan had collapsed, Bernard J. Yungbluth, president of the International Railway, Buffalo, and its subsidiary company, the International Bus Corporation, said the traction interests plan to carry out the first steps of the co-ordinated bus-trolley plans filed with the Buffalo City Council last summer. These plans were held up by the municipal authorities when Mr. Howe entered the field with his 5-cent bus proposal, for which he later secured a franchise from the city.

The application of the International Railway and the International Bus Corporation on file with the city covers five of a dozen steps in a general plan for co-ordinated bus-trolley service. These are:

Establishment of a Best-North Street bus line and abandonment of the Best Street car line; establishment of a Richmond Avenue bus line and abandonment of the Hoyt Street car line; extension of the Bailey Avenue bus line from Kensington Avenue city line to East Seneca Street and over McKinley Parkway after the parkway is completed and abandonment of the Bailey Avenue car line; extension of the Delaware Avenue bus line from the Terrace to Shelton Square at Main Street; rerouting Delavan Avenue bus line, a cross-town service, over Potomac Avenue from Chapin Parkway, which will allow abandonment of part of the Forest Avenue car line from Delavan Avenue to Niagara Street.

There will be little opposition to the establishment of new bus routes and the extension of existing bus lines, but it is understood the City Council is opposed to the abandonment of car lines which have been long established, on the basis of the plan outlined in the Yungbluth proposals.

Allentown Bus Service Planned

In furtherance of a statement made some time ago by the Lehigh Valley Transit Company, Allentown, Pa., of its intention to adapt the bus to the transportation problem, comes the announcement from H. F. Dicke that a bus line operating on Turner Street, between Nineteenth and Seventh Streets, would be established as soon as the Public Service Commission granted the permit. The plans as they now stand call for a fifteen-minute service for two periods of three hours each in the morning and evening and a 30-minute headway during the rest of the day. Two buses will be used to maintain the former schedule and one during the so-called off-peak hours. A 10-cent fare will be charged. This will include transfer privileges to any of the company's lines. In opening the new line the company had in mind the accommodation of customers living far from present car lines.

In December of last year the company applied for a certificate to operate buses for "group and party service."

Railway Pays State Biggest Bus Bill

A check for $50,009, the largest bus license ever paid in the State of Minnesota and one of the largest ever paid in the United States, was delivered on Jan. 27 by the Twin City Motor Bus Company, Minneapolis and St. Paul, to Mike Holm, Secretary of State of Minnesota. This company is a subsidiary of the Twin City Rapid Transit.

The check is in payment of the 1926 license for 94 buses and four service cars operated by the bus company on its intercity lines as well as several suburban lines. This is a tax of 10 per cent on the list price, with a depreciation allowance of 10 per cent a year with a minimum tax of $350 for each bus operated.

The average fee is approximately $500 a bus. In addition to this state tax the company pays federal taxes of $20 a bus for the year May 1, 1925, to April 30, 1926. This is an additional tax of more than $8,000, or an aggregate tax of approximately $58,000.

Abandonment and Bus Petitions Before Utah Commission

The Utah Light & Traction Company, Salt Lake City, Utah recently applied to the Public Utilities Commission for permission to abandon its Davis County line, serving the towns of Centerville and Bountiful and intermediate territory. The application was in the form of a petition in intervention before the commission at the hearing of the application of the Bamberger Electric Railroad, which is seeking a permit to operate an automobile passenger and express line between Salt Lake and Ogden. It is requested that if the order of abandonment is permitted to the railway the bus line application of the interurban should be allowed provided the bus service will not pick up passengers in Salt Lake for discharge within the corporate limits of the city. If, however, the commission should refuse the petition in intervention, it is asked that the petition of the Bamberger company be denied.

Holyoke Railway Wins Point

The Holyoke Street Railway and the Interstate Bus Corporation, both of which have aired their differences in the county criminal and civil courts, have had their case settled by a triple bench of the federal court. Massachusetts bus control statutes were found to be constitutional, and the Interstate Bus Corporation is to be restrained from operating buses through Massachusetts cities without a license to do so. An injunction has been issued.

The Interstate Bus Corporation operates lines in all of the New England states except Maine. Its principal field of operation is in Boston and Providence. It recently brought proceedings into the federal court against the Holyoke Street Railway alleging collusion in interfering with the bus business in Holyoke, Mass. The suit was a counter one against the railway, which sought an injunction to prevent the bus company from operating.

The litigations began with a suit by the Holyoke company to prevent the operation of buses between Greenfield and Springfield, Mass. The suit was removed to Boston and warrants for the arrest of the bus company's chauffeur's followed. The bus company filed a complaint in an equity suit and obtained an order to show cause why an injunction to restrain the criminal prosecutions should not be granted. This order was given only after a long-drawn-out hearing.

Judges George W. Anderson, John A. Peters and Elisha H. Brewster ruled:

> These two cases have, by agreement, been heard together on agreed facts. They are, in effect, cross suits, and involve a single issue—the constitutionality of the Massachusetts statutes regulating the operation of buses in Masssachusetts highways. These statutes are stated, construed and sustained by the full court of Massachusetts in Barrows vs. Farnum's stage line, and need not here be restated.

Interstate Bus Service Curtailed in New Jersey

Acting on the complaint of the Public Service Railway, Newark, N. J., the Board of Public Utility Commissioners has ordered the Pierce Coach Corporation to discontinue the transportation of passengers between points within the state in connection with the operation of a bus line between Morristown and Orange and New York. In the absence of municipal permits authorizing local service, the carrying of passengers whose journeys begin and end in New Jersey was held to be illegal.

Gasoline Tax Increased in Kentucky

The Kentucky Legislature on Feb. 20 passed a bill in which the gasoline tax is increased from 3 to 5 cents a gallon. It was approved with a wide majority in both the House and the Senate. The measure was recommended by the Governor. The law is to become effective at once and continue until July 1, 1928, provided no succeeding Legislature may change the time limitation. Other bills are before the state to increase license taxes on buses and taxicabs, on the basis of a seat charge, greater than that now in effect.

Cross-town Line in Fond du Lac.—The City Council of Fond du Lac, Wis., has accepted the proposition of the Wisconsin Power & Light Company to operate a cross-town bus line in that city. This bus system would work in harmony with the company's railway with interchangeable transfers. The application of the company was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 13, page 299.

New Line to Run.—The Lordship Railway, Bridgeport, Conn., has been authorized by the Public Utilities Commission to operate a new bus line between Avon Park, Stratford, and Bridgeport, connecting with its present bus route from Lordship to Bridgeport. Two buses are now operated on a one-hour headway.

Line to Be Replaced with Bus.—The Southern Public Utilities Company, Anderson, S. C., plans to replace its line to North Anderson with bus service. The line to North Anderson has been in service since the development of the northern suburb began several years ago. It was not stated whether the line had been operated at a loss or not, but it was said that the bus would prove more beneficial to the residents of that suburb.

More Buses at Asheville.—Any day now seven new passenger buses costing $11,000 each and seating 29 people will be put in operation in Asheville by the Asheville Light & Power Company. Some of the equipment will be put on the run between Asheville and West Asheville. The purchase brings the total number of buses owned and operated by the company up to nine. Decision to utilize buses rather than cars was reached after a conference with city officials in regard to the traffic situation.

Bus License Sought Again in Westfield.—The Springfield Street Railway is still seeking a bus license to operate in Westfield, Mass. The City Council has not yielded despite numerous meetings and long arguments. At least two members of that body are holding out for assurance that the railway will maintain one crosstown trolley line. The railway says such a line does not pay and will not promise to continue operating any line at a loss. To further the interest of the city of Westfield the Springfield company has signified its intention to replace all highways to the satisfaction of the highway department, if licenses are granted to operate buses.

Fare Increased from Eight to Ten Cents.—The Public Utilities Commission of the District of Columbia has authorized the Washington Railway & Electric Company to increase the fare on its Burleith bus line from 8 cents cash, six tokens for 40 cents and 2 cents for transfers between intersecting car and bus lines to 10 cents cash with tickets sold at the rate of six tickets for 50 cents provided that a free transfer, good on any intersecting car or bus line of the company, be issued in payment of 10 cents cash fare or on payment of one ticket fare and 2 cents. Transfers to the Burleith bus line will be issued by connecting car and bus lines for 2 cents only upon the payment of an 8-cent cash fare.

Financial and Corporate

$1,043,401 Net Income for Chicago Rapid Transit

Company Operating Elevated Lines Reports Progress During 1925—Expenses $199,600 Less than 1924

Gross revenues of the Chicago Rapid Transit Company, Chicago, Ill., for the year ended Dec. 31, 1925, representing combined operating and non-operating revenue, were $19,281,887, an increase of $505,954 over the previous year. Total expenses, including taxes and $241,906 for retirement reserve, were $14,967,509, or $199,600 less than the year before.

Net earnings were $4,314,378, an increase of $705,554. Interest, rentals and amortization of discount totaled $3,270,977, leaving net income of $1,043,401, an increase of $242,025 over the year 1924.

Dividends on the company's outstanding 7.8 per cent prior preferred stock were declared and paid to the extent of $308,529, leaving $734,871 as unappropriated surplus earnings for the year, no interest having been declared or paid on the company's adjustment debenture bonds. To this surplus should be added other net credits to profit and loss of $38,169 and the surplus of $958,672 from the previous year, making a total surplus at the end of the year 1925 of $1,731,713.

The rapid transit lines carried 216,045,575 revenue passengers in 1925, an increase of 3,144,551 compared with 1924.

One hundred new steel motor cars, ordered Dec. 19, 1924, were placed in service, the last of these being delivered on Nov. 23, 1925. These cars provide the maximum of comfort and safety and cost $2,268,840. The company now has 1,906 cars in service, including 1,862 passenger cars, of which 456 are all-steel construction. For the last ten years the company has been purchasing steel equipment in anticipation of a subway being built.

In September, 1924, the company requested the city for permits to extend all station platforms so as to allow eight-car train operation, which would substantially improve the service. Permits were obtained from time to time, but it was not until the city passed an enabling ordinance on July 22, 1925, that authority to extend all platforms was secured. The work was started the day following the passage of this ordinance and has been carried on continuously ever since. The work of extending the platforms on the Loop, Ravenswood-Kenwood, Howard-Jackson Park, Lake Street and Garfield Park lines has been practically completed. On the Douglas Park, Logan Square and Humboldt Park lines extensions will be completed soon.

While the number of passengers carried on the elevated lines in 1925 showed an increase, the ill effects of the handicap of inadequate loop terminal facilities became increasingly apparent. The company put into effect the only remedy available to it in the extending of loop platforms to accommodate eight-car trains. This has proved of considerable benefit in the rush-hour periods, but far from meets the situation.

On Sept. 27, 1924, the company publicly announced its policy of extending and enlarging its service by formally requesting the City Council of Chicago for consent to construct about 40 miles of specified elevated extensions, estimated to cost approximately $31,500,000. If such consent is obtained it is the company's intention to commence the work of constructing the extensions without delay and to complete the same as soon as practicable.

In addition the company, in order to obtain much-needed additional capacity for handling passengers in the central business district, has proposed to the City Council that if the city would build and grant the company the use of a rapid transit subway running from 22d Street north through the Loop district to North Avenue and connecting at both ends with the elevated lines, the company stood ready to enter into an agreement to pay to the city for the use of such subway a fair compensation

INCOME STATEMENT OF CHICAGO RAPID TRANSIT COMPANY FOR THE YEAR ENDED DEC. 31, 1925

Passenger revenue		$17,786,474
Other transportation revenue		1,245,338
Gross operating revenue		$19,031,812
Operating Expenses:		
Maintenance of way and structures	$1,778,749	
Maintenance of car equipment	1,444,216	
Power	1,979,684	
Conducting transportation	7,006,823	
General and miscellaneous	1,135,721	
Total operating expenses		*$13,345,194
Net operating revenue		$5,686,618
Taxes, city compensation, etc		1,622,314
Operating income		$4,064,303
Non-operating income		250,074
Gross income		$4,314,378
Deductions:		
Rentals	$881,282	
Interest on mortgage debt and equipment obligations	2,277,380	
Other interest	†55,498	
Amortization of discount	56,816	
Total		$3,270,977
Net income for the year 1925		$1,043,401

SURPLUS ACCOUNT

Balance, surplus Dec. 31, 1924		$958,672
Net income for the year ended Dec. 31, 1925 (as above)	$1,043,401	
Less dividends paid on prior preferred stock	308,529	
Surplus earnings for the year unappropriated		$734,871
		$1,693,544
Miscellaneous debits and credits (net)		38,169
Surplus, Dec. 31, 1925		$1,731,713

*Total operating expenses include $241,906.92 credited to retirement reserve.
†No interest declared or paid on adjustment debenture bonds.

either by way of fixed rental or a division of earnings. It is estimated the use of such a subway would enable the company, during the rush periods, to carry about twice the number of passengers it is now capable of carrying in such periods in and through the Loop.

On Nov. 16, 1925, work had progressed to the point where a considerable number of eight-car trains could be added to the service. The cost of this improvement, inclusive of platform extensions, changes in structure and car equipment and new equipment as previously stated, is $3,322,063.

On March 28, 1925, rapid transit service was extended to Dempster Street, Niles Center, the Chicago Rapid Transit Company having leased trackage rights over the new Skokie Valley line of the Chicago, North Shore & Milwaukee Railroad. This new line extends westward from the Howard Street station of the Evanston division and north to Dempster Street, Niles Center, a distance of 5 miles. It is believed that the territory tributary to this line will be rapidly built up and that it will soon become a valuable addition to the company's system.

A trackage lease was negotiated with the Chicago, Aurora & Elgin Railroad under which rapid transit service will soon be extended over that railroad to additional western suburbs of the city, including Maywood, Bellwood and the new community of Westchester.

For the purpose of defraying the cost of the new cars and platform extensions above mentioned and other corporate purposes the company during the year sold $2,212,000, par value, of first and refunding mortgage 6½ per cent gold bonds (series due 1944).

During the year the company paid off or acquired its underlying bonds and equipment obligations aggregating $1,117,000. This includes $231,000 first mortgage bonds of the Northwestern Elevated Railroad acquired for the sinking fund.

Attitude of Government on Non-Voting Stock

The government doubts if there is any way in which it can legaly meet the situation visualized by Professor Ripley in his campaign against non-voting stocks. Sec. 240 of the revenue bill, having to do with the consolidated returns of affiliated corporations, was before the Senate. The test of affiliation was a certain percentage of the voting stock. The Senate, by amendment, struck out the word "voting." High legal opinion is that this amendment resulted from the Ripley agitation and that "it will increase the tax difficulties of public utilities." Another view is that it sets up as a precedent the theory that the total stock is the test of affiliation, wherefore, in anti-trust suits, a similar test should lie, in which case unity of control through ownership of management, or "B" stocks would not be subject to attack if the "A" stocks were widely held. The argument seems a little far fetched, but it is worth noting.

Increase in Illinois Power & Light Preferred Stock

A special meeting of stockholders of the Illinois Power & Light Corporation was held on Feb. 23 for the purpose of submitting to the vote of the stockholders the question of increasing the authorized capital stock of the corporation by increasing the authorized par amount of the 7 per cent cumulative preferred stock from $30,000,000 to $40,000,000.

The sale of 7 per cent cumulative preferred stock of the corporation has been successfully continued during the past year to customers residing in the various communities in which the company's properties are located and through other channels, with the result that the present authorized amount of 300,000 shares of the par value of $100 each has now been nearly all sold and issued. The increased amount can only be issued upon approval by the Illinois Commerce Commission and upon condition that net earnings are not less than twice the annual dividend requirement on shares now outstanding and to be issued, and that the assets of the company after deducting liabilities shall not be less than $125 for each share, including the consideration to be paid for the new stock.

On Feb. 23 Blyth, Witter & Company, New York, offered $2,000,000 of the 7 per cent preferred issue of the company for subscription at $100 a share and accrued dividend. The balance for bond discount, depreciation and dividends in 1925 was $5,403,301 compared with $4,621,000 in 1924.

East Avenue Bus Operation at Rochester Unprofitable

The report of James F. Hamilton, president, for the year 1925 on the operations of the East Avenue Bus Company, a subsidiary of the New York State Railways, Rochester (N. Y.) lines, shows a deficit of $4,495.

The net operating expenses exceeded the revenues by $12,361, which, with taxes imposed, brought the net operating deficit to $13,226. Offsetting this loss in part was the sum of $10,290, which represents the non-operating income or the difference between the results of the operation of the Browncroft line, a part of the company's system, and the return of the 8 per cent guaranteed under the company's five-year contract with the Browncroft Realty Corporation.

The East Avenue Bus Company operates the East Avenue line, purchased in 1924 from an independent company. This route connects the heart of Rochester's business section with the suburban village of Pittsford, 10 miles to the east. It traverses East Avenue throughout, a street which for a mile is the center of the fashionable shopping district and thereafter the most exclusive residential street in Rochester.

The Browncroft line was established about a year ago, linking the business section with the exclusive subdivision of Browncroft, a 6-mile route. This line is patronized chiefly by well-to-do business men and their families and by late theater crowds, for whom special service is provided. At first a 25-cent

SUMMARY OF OPERATIONS OF THE EAST AVENUE BUS COMPANY, ROCHESTER

Operating revenues	$44,666
Operating expenses	57,028
Net operating deficit	*$12,361*
Taxes assignable to bus operation	864
Operating deficit	*$13,226*
Non-operating income	*10,290
Gross income	*$2,936*
Deductions from gross income	1,558
Net deficit	*$4,495*

*This item represents the difference between the results of operation of the Browncroft Bus Line and the return of 8 per cent guaranteed under the five-year contract with the Browncroft Realty Corporation.

Figures in italics denote deficit.

Conspectus of Indexes for February 1926

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War: High	Since War: Low
Street Railway Fares* 1913 = 4.84	Feb. 1926 **7.35**	Jan. 1926 **7.32**	Feb. 1925 **7.24**	Feb. 1926 **7.35**	May 1923 **6.88**
Electric Railway Materials* 1913 = 100	Feb. 1926 **155.3**	Jan. 1926 **154.3**	Feb. 1925 **153.1**	Sept. 1920 **247.5**	Oct. 1924 **148.5**
Electric Railway Wages* 1913 = 100	Feb. 1926 **223.8**	Jan. 1926 **223.8**	Feb. 1925 **221.0**	Sept. 1920 **232.0**	March 1923 **205.8**
Am. Elec. Ry. Assn. Construction Cost (Elec. Ry.) 1913 = 100	Feb. 1926 **201.9**	Jan. 1926 **202.2**	Feb. 1925 **203.9**	July 1920 **256.4**	May 1922 **167.4**
Eng. News-Record Construction Cost (General) 1913 = 100	Feb. 1926 **206.6**	Jan. 1926 **207.2**	Feb. 1925 **209.7**	June 1920 **273.8**	Mar. 1922 **162.0**
U. S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	Jan. 1926 **156.0**	Dec. 1925 **156.2**	Jan. 1925 **160.0**	May 1920 **246.7**	Jan. 1922 **138.3**
Bradstreet Wholesale Commodities 1913 = 9.21	Feb. 1 1926 **13.72**	Jan. 1 1926 **14.01**	Feb. 1 1925 **13.89**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
U. S. Bur. Lab. Stat. Retail Food 1913 = 100	Jan. 1926 **164.3**	Dec. 1925 **165.5**	Jan. 1925 **154.3**	July 1920 **219.2**	Mar. 1922 **138.7**
Nat. Ind. Conf. Bd. Cost of Living 1914 = 100	Jan. 1926 **170.4**	Dec. 1925 **171.4**	Jan. 1925 **167.1**	July 1920 **204.5**	Aug. 1922 **154.5**
Steel Unfilled Orders (Million Tons) 1913 = 5.91	Jan. 31 1926 **4.883**	Dec. 31 1925 **5.033**	Jan. 31 1925 **5.037**	July 31 1920 **11.118**	July 31 1924 **3.187**
Bank Clearings Outside N. Y. City (Billions)	Jan. 1926 **19.63**	Dec. 1925 **20.20**	Jan. 1925 **18.59**	Oct. 1925 **20.47**	Feb. 1922 **10.65**
Business Failures Number	Jan. 1926 **2073**	Dec. 1925 **1628**	Jan. 1925 **2340**	Jan. 1924 **2231**	Aug. 1925 **1353**
Liabilities (Millions)	**48.23**	**43.11**	**64.44**	**122.95**	**27.22**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 144 of the largest street and interurban railways operated in the United States, weighted according to the number of such men employed on these roads.

fare was charged with no stops. After a few months the company cut the fare to 15 cents and stopped buses on signal.

The equipment is carried in the assets at $73,091.

Deficits in Portsmouth Must Be Wiped Out

The Portsmouth Public Service Company, Portsmouth, Ohio, suffered a deficit of $62,346 in 1925. This, added to the other deficits of the past three years, makes a total of $137,374 reported to City Auditor Ralmadge Edwards. James F. Loftus, general manager, in a letter accompanying the financial statement, declared that unless there was some "material change" in the number of car riders the outlook for the railway, as a money-making investment, was "far from encouraging." With a view to reducing the loss, the company is considering a number of changes, among them one-man car operation. This new system will likely go into effect on March 1. The company operates 37 miles of line and charges 7 cents for fare. No change in this rate is contemplated during the present year.

Receiver Liquidates First Mortgage Issue.—The entire issue of $50,000 Flushing & College Point Electric Railway first mortgage 5 per cent bonds due June, 1925, have been liquidated by the receiver of the New York & Queens County Railway, New York, N. Y. An order of the New York State Supreme Court authorized the receiver to pay not more than $850 for each $1,000 bond with all unpaid coupons attached. Fisk & Roberts, New York, negotiated the settlement with the bondholders, some of whom were represented by a protective committee.

$159,176 Decrease in Net at Detroit

Extraordinary Expenditures for Repairs and Advance in Wages Cut Down Municipal Railway Earnings

During the year ended Dec. 31, 1925, the balance of net income of the Department of Street Railways at Detroit, Mich., was $566,793, while for the year ended Dec. 31, 1924, it was $725,969, a decrease of $159,176. The balance of net income for the first six months of 1925 was $306,623, while for the last six months it was $260,169, but in the latter period $257,787 more was expended for repairs to tracks and cars than was expended in the first six months of 1925. Of this amount $102,207, is classed as extraordinary; another important matter was the increase in wage granted to the platform men, which amounts to about $150,000 increase over what was paid in the first six months for like service performed. Had no more been expended on repairs in the last six months than in the first six months, the balance of net income would have been $517,956.

The facts are taken from the financial statement of the Department of Street Railways of the city of Detroit, covering December, 1925, and the year ended Dec. 31, 1925, issued by W. M. Hauser, auditor. The system that has now been finally adopted by Mr. Hauser is to give the general balance sheet at the close of business on the last day of the month, and an income and statistical statement for the month compared with the corresponding month of the preceding year.

The balance of net income for December, 1925, is $78,876, after the payment of sinking fund charges. The balance of net income for the month of December, 1924, was $74,823, so that the past month shows an increase over that for December, 1924, of $4,052, or 5.4 per cent.

During the year ended Dec. 31, 1925, 481,236,694 passengers were carried by the rail lines and 10,951,951 by the coach lines, a total of 492,188,645 passengers, compared with a total of 458,540,992 for the year ended Dec. 31, 1924, divided 457,562,210 rail lines and 978,782 coach lines, so that the Department of Street Railways carried 33,647,653, or 6.8 per cent, more passengers in the year 1925 than in the year 1924.

Mr. Hauser points out that accrued depreciation has been provided in the accounts in the amount of $3,179,111, equal to about 3 per cent a year on the value of the depreciable property. This amount represents a transfer from surplus to a separate account and is invested in property.

In considering the subject of depreciation it should be remembered that this account admits of several definitions and usages, depending upon the purpose of its use and the attitude of mind of the user. In point of fact depreciation implies a decline in value; that is, diminution of productive or net earning capacity, it is cited. Obsolescence or inadequacy are not results of age or upkeen, for the reason that a street car or any other physical unit of the property, regardless of its age or maintenance condition, may become obsolete or inadequate, or both, at any time when in the best of judgment of the owners it is unsuitable for the service required.

With reference to the operating reserves for injuries and damages, the amount has been adjusted to $774,267; $700,000 has been credited back to surplus. Price, Waterhouse & Company, in their report rendered on Nov. 9, 1925, on the accounts of the Department of Street Railways stated that "from the information so obtained the reserve as at June 30, 1925, is more than 100 per

INCOME AND STATISTICAL STATEMENT OF THE DEPARTMENT OF STREET RAILWAYS AT DETROIT

Income	Year Ended Dec. 31, 1925	Year Ended Dec. 31, 1924
Operating Revenue		
Railway operating revenue	$22,413,689	$21,678,906
Coach operating revenue	818,328	51,282
Total operating revenue	$23,232,017	$21,730,188
Non-operating income	184,273	141,766
Total revenue from all sources	$23,416,291	$21,871,955
Operating Expenses		
Railway operating expenses	$16,572,497	$15,383,494
Coach operating expenses	786,557	41,701
Total operating expenses	$17,359,055	$15,425,195
Net revenue from all sources	$6,057,235	$6,446,760
Deduct		
Taxes assignable to operation	$705,615	$716,616
Other deductions	935	105,548
Interest on funded debt:		
On purchase bonds	$155,380	$161,033
On construction bonds	785,875	785,875
On addition and betterment bonds and notes	137,305	152,613
On purchase contract (D. U. R.)	854,662	916,810
Total interest	$1,933,224	$2,016,332
Total deductions	$2,639,774	$2,838,496
Net income	$3,417,461	$3,608,263
Disposition of Net Income		
Sinking funds:		
For purchase bonds	$133,000	$133,000
For construction bonds	571,351	565,654
For addition and betterment bonds and notes	358,798	396,121
For purchase contract (D. U. R.)	1,787,518	1,787,518
Total sinking funds	$2,850,667	$2,882,293
Balance for the period	$566,793	$725,969

Statistics	Year Ended Dec. 31, 1925	Year Ended Dec. 31, 1924
Railway revenue car-miles	52,863,111	48,248,330
Coach revenue coach-miles	3,529,795	157,540
Railway revenue car-hours	5,692,190	5,267,176
Coach revenue coach-hours	.....	.....
Railway revenue passengers	357,926,168	346,116,298
Railway transfer passengers	123,310,526	111,445,912
Railway total passengers	481,236,694	457,562,210
Coach revenue passengers	10,564,723	978,782
Coach transfer passengers	387,228	.....
Coach total passengers	10,951,951	978,782
Total revenue and transfer passengers	492,188,645	458,540,992
Railway operating revenue per car-mile, cents	42.40	44.93
Coach operating revenue per coach-mile, cents	23.18	32.55
Railway operating expenses per car-mile, cents	31.35	31.88
Coach operating expenses per coach-mile, cents	22.28	26.47
Railway operating revenue per car-hour	$3.94	$4.12
Coach operating revenue per coach-hour	.....	.....
Railway operating expenses per car-hour	2.91	2.92
Coach operating expenses per coach-hour	.....	.....
Ratio of transfer passengers to revenue passengers—railway, per cent	34.45	32.20
Ratio of transfer passengers to revenue passengers—coach, per cent	3.66	.....
Railway revenue passengers per car-mile operated	6.77	7.17
Railway transfer passengers per car-mile operated	2.33	2.31
Total railway passengers per car-mile operated	9.10	9.48
Coach revenue passengers per coach-mile operated	2.99	6.21
Coach transfer passengers per coach-mile operated	.11	.....
Total coach passengers per coach-mile operated	3.10	6.21
Ratio of railway operating expenses to railway operating revenue, per cent	73.94	70.96
Ratio of coach operating expenses to coach operating revenue, per cent	96.12	81.32

cent in excess of the indicated requirement at that date."

In view of this it has been found proper, the auditor states, to effect an adjustment in this account. Claims paid and charged to the reserve account during the period from Sept. 1, 1921, to June 30, 1925, amounted to $582,001, while claims paid since July 1, 1925, to Dec. 31, 1925, amounted to $194,411, of which $134,881 was for accidents prior to June 30, 1925, and $59,529 for accidents subsequent to July 1, 1925.

While up to June 30, 1925, it was not the practice of the Department of Street Railways to set aside funds for the specific purpose of liquidating claims for injuries and damages, the basis of accounting has now been changed in this respect and appropriations of cash are now being made for the purpose of liquidating liabilities of this nature. At Dec. 31, 1925, $106,758 had been set aside in cash, so that of the $774,267 shown as reserved $106,758 is actually set up in cash.

The balance of net income at Detroit for January, 1926, is $56,698 after the payment of sinking fund charges. The balance of net income for January, 1925, was $52,551, so that the past month shows an increase of $4,147, or 7.9 per cent over January, 1925.

During January, 1926, 43,162,941 passengers were carried by the rail lines and 1,692,191 by the coach lines, a total of 44,855,132, compared with 40,145,926 in January, 1925, divided 39,889,805 rail lines and 256,121 coach lines. In other words, 4,709,206, or 11.7 per cent, more passengers were carried in January, 1926, than in January, 1925.

The five years of operation at Detroit since Feb. 1, 1921, is summed up by Mr. Hauser, auditor of the department, as follows:

In five years $45,327,701 was provided for capital cost. Of this amount $41,080,000 was provided by vote of the electorate now represented by $37,131,000 debt, $3,949,000 having been paid off from earnings. The sum of $4,007,971 was provided out of earnings, of which $3,691,113 represents accrued depreciation, the accrual being invested in property. The amount of $316,868 shown as profit and loss balance and $239,729 received from the sale of property go to help make up the total amount of $45,827,701, which is represented in the capital costs as follows:

Of the amount of $45,560,410, $44,293,545 represents road and equipment, $114,600 working funds and $1,152,264 material and supplies. In other words, the system fully equipped to do business has cost $45,560,410. This amount is in excess of the provisions made for it by $232,708. It represents the amount that the current and working liabilities are in excess of the current and working assets.

All sinking fund and operating reserves and interest requirements are funded 100 per cent, and specific cash and securities are now carried in funds to protect the sinking fund and operating reserves and interest requirements up to and including Jan. 31, 1926. In the case of the reserve for injuries and damages, the diversion of these funds by the former management for construction purposes has been replaced and made good.

The close of five years finds the department with the following:

Sinking fund, consisting of cash and securities for debt purposes	$5,392,290
Special deposits, consisting of cash for interest purposes	409,720
Insurance and other funds, consisting of cash for:	
(a) Injuries and damage purposes	198,845
(b) Repairs and renewal purposes	30,000
Total	$6,630,855

Outlook for Iowa Interurban Improved

The protective committee representing the holders of the first mortgage bonds of the Waterloo, Cedar Falls & Northern Railway, Cedar Falls, Iowa, has submitted to the bondholders a three years condensed comparative statement of operations of the company, as follows:

	1925	1924	1923
Gross earnings	$827,353	$860,308	$896,104
Operating expenses	750,899	792,602	828,385
Taxes	48,166	38,612	38,659
Net income applicable to first mortgage bonds	$28,288	$29,093	$29,060

The amount necessary to pay the annual interest on the outstanding $5,773,000 first mortgage 5 per cent bonds is $288,650.

The committee says that while on the surface the net income in 1925 was less than that of 1924, it is significant that the last quarter of 1925 showed a gross increase of $23,835 over the similar period of 1924, which encourages the hope that business conditions in Iowa—long depressed—have at last turned the corner. Earnings in January, 1926, exceeded those of December, the best month of 1925.

Long continued unfavorable business conditions in the territory served by the company, combined with aggressive bus competition, the general use of the automobile, and a falling off in coal and grain freights, are advanced as reasons for the decrease in gross earnings, while the high cost of operation and necessary outlays for maintenance, together with the necessity for meeting accumulated taxes and equipment obligations, have reduced the net income to about one-tenth of the amount required to pay the first mortgage bond interest. These considerations explain why the committee has thus far been unable to submit to the bondholders a plan of reorganization.

Up to date there have been deposited with the protective committee $5,188,000 out of a total of $5,773,000 outstanding first mortgage bonds and $2,170,000 out of a total of $2,333,000 outstanding common stock.

Receiver Appointed at Rockford

Adam Gschwindt, general manager of the Rockford Electric Company, was appointed receiver for the Rockford City Traction and Rockford & Interurban Railway, Rockford, Ill., under action instituted recently by trustee for bondholders of the two systems. Mr. Gschwindt has announced that his general policy will be to abandon profitless interurban lines and gradually to separate them from city lines, but there will be no immediate change in operating policy of the city lines. It was generally understood that the receiver had reference to the Rockford, Beloit & Janesville and Rockford & Freeport interurbans as lines to be abandoned. The receivership followed default of the interest payment on $1,650,000 of bonds, but bondholders are reported to have assured Mr. Gschwindt that they stand ready to back such improvements as he may determine. The Rockford Electric Company is one of the largest creditors of the traction systems. There was no opposition to the court's selection of the receiver.

New Directors in Alliance.—New directors of the Stark Electric Railroad, Alliance, Ohio, were chosen recently as follows: N. F. Glidden, Howard Morris of New York, James Bertran, W. S. Chittenden, L. W. Popp, E. W. Sweezy, O. K. Ayers and Charles Sebring.

Electric Plant Acquired.—Announcement has been made of the purchase of the Marengo Public Service Company, an electric company of Marengo, Ill., by the Illinois Northern Utilities Company, Freeport, Ill. R. T. Fry, Marengo, has been in charge of the local plant. The purchaser will take possession on March 1.

Companies Consolidated. — Seven companies which have been operated as subsidiaries of the Wisconsin Public Service Corporation have been consolidated with the main system and will conduct all business as the Wisconsin Public Service Corporation. Included in the group are the Green Bay Park Railway, serving Bay Beach Park and the River View Motor Bus Company, supplying interurban service between De Pere & Green Bay and city service in Manitowoc.

Receiver Sought.—Suit asking that the Indianapolis, New Castle & Eastern Traction Company, Anderson, Ind., be placed under control of a receiver and that Arthur W. Brady, present receiver of the Union Traction Company of Indiana, be named receiver, has been filed in the Circuit Court at Muncie, Ind., by the Fidelity Trust Company, trustee, holder of bonds aggregating $1,500,000 issued in June, 1912. The action was ordered transferred to Anderson, Ind. The Indianapolis, New Castle & Eastern Traction Company is operated under lease by the Union Traction Company.

Authorized Issues Under 1924 Amount. — During the twelve months ended Dec. 31, 1925, the California Railroad Commission authorized the issue of $132,036,749 of stocks, bonds, notes and other evidences of indebtedness. The total issue was below the amount for the last few years, $237,875,848 having been authorized in 1924 and $196,802,936 in 1923. Electric railway issues totaled $3,610,461 in 1925 compared with $13,067,496 in 1924.

City's Share Lower.—Ralph E. Carley, manager of the western division of the Illinois Power & Light Corporation, supplying Quincy, Ill., with traction service, recently submitted a report of the finances of the company's operation in that city, under terms of the ordinance which requires payment of 2 per cent of the gross earnings annually. The 1925 payment to the city was $5,226 from $261,343, the company's gross, which included $252,350 from street car lines and $8,993 from buses. Comparisons show a gradual and continued decline in earnings since 1920, when the city's share was $6,443; 1921, $5,682; 1922, $5,456; 1923, $5,470, and 1924, $5,238.

Personal Items

J. R. Ong at Cincinnati

Former Railway Consultant Placed in Charge of New Department of Street Railway

Creation of a new department, to be known as transportation engineering, in charge of Joe R. Ong, has been announced by Walter A. Draper, president of the Cincinnati Street Railway, Cincinnati, Ohio. For several years Mr. Ong has resided at Piqua, Ohio, where he has engaged as a consulting electric railway transportation engineer. In his new capacity he will have charge of all traffic surveys, the making of schedules and will devote considerable time to studies in economies of operation. He also will have charge of general statistical data of an operating nature.

J. R. Ong

Mr. Ong has made a number of exhaustive traffic surveys in different parts of the country which have brought him into prominence as a consulting engineer. Notable among these was his work in Los Angeles, Cal.; Winnipeg, Canada, and Atlanta, Ga. He goes to the Cincinnati Street Railway with a record of accomplishments in all undertakings in which he has been identified. He has already assumed his new duties and is co-operating with J. B. Stewart, Jr., general manager, in working out a plan to secure the contemplated results of the new department.

From 1911 to 1912 Mr. Ong was superintendent of substations and assistant electrical engineer for the Fort Dodge, Des Moines & Southern Railroad, with headquarters at Boone, Iowa. The following year he assumed the duties of electric railway engineer, serving jointly the Railroad Commission of Wisconsin and the Tax Commission of that state on appraisals of public utility properties and in traffic and service studies on street railway properties in Milwaukee and other cities of the state.

In 1918 he became electric railway transportation engineer for the Board of Control of the Kansas City Railways and from 1919 to 1920 held a similar position with the Winnipeg Electric Railway, Canada. The following year he became electric railway transportation engineer for the Georgia Railway & Power Company, Atlanta, Ga., and held that post until 1923, when he became a consulting engineer with, headquarters at Piqua. In that capacity he made an exhaustive survey for the management of the Los Angeles Railway and studies in economies of operation for a number of other electric railways throughout the country.

Before going to college Mr. Ong served with the Indianapolis & Cincinnati Traction Company and the Chicago, Lake Shore & South Bend Railway. His first work after leaving college was done for the Westinghouse Electric & Manufacturing Company at its main plant in East Pittsburgh. Later he was transferred to the company's Philadelphia sales office.

Mr. Ong was born at Columbus, Ind. He was graduated from Purdue University in 1909 as an electrical engineer.

E. M. Hervey in Consulting Work

E. M. Hervey, connected with the Wisconsin Power & Light Company as manager of its Sheboygan electric and railway properties for the last three years, has resigned to enter business for himself as a consulting engineer in the power transmission field. In that work he has specialized for the past twenty years. Prior to his promotion as manager Mr. Hervey was the company's electrical engineer at Sheboygan.

Personnel Changes in Dayton

The annual meeting of the stockholders of the City Railway, Dayton, Ohio, was held on Feb. 11. As the company personnel is now constituted the officers are: J. M. Markham, president, whose election was referred to in the ELECTRIC RAILWAY JOURNAL, issue of Feb. 20; H. S. Mead, vice-president; W. S. W. Edgar, secretary, and T. A. Ferneding, treasurer. The directors are: W. S. W. Edgar, T. A. Ferneding, J. M. Huffman, W. H. Kuhlman, J. M. Markham, H. S. Mead and V. Winters.

Thomas E. Howell remains as general manager and Edward H. Hartman continues as superintendent of transportation.

L. P. Fessenden Manager at Sheboygan

L. P. Fessenden, chief engineer and superintendent of the Sheboygan central station since 1912, has been selected to succeed E. M. Hervey as manager of the Sheboygan electric and railway properties of the Wisconsin Power & Light Company. Mr. Fessenden's responsibilities at the same time will be widened to include the district managership of all the company's properties in Sheboygan and Plymouth.

F. A. Richards Vice-President and Sales Manager American Car

Ford A. Richards, sales manager of the American Car Company since 1918, has been honored by the directors by also being elected to the vice-presidency. As sales manager Mr. Richards has enjoyed a wide acquaintanceship, particularly throughout the territory west of the Mississippi River, covered by his company for the Brill organization.

His affiliation with the electric railway industry dates back to 1898, when he entered the employ of the Peckham Manufacturing Company, then builder of electric railway trucks. During the intervening 28 years he has been engaged in various capacities, including that of assistant to the vice-president and foreign sales manager of the Peckham company and later as a member of a partnership under the name of the J. A. Hanna Company, formed to promote the sale of both cars and trucks.

Mr. Richards joined the Brill organization in 1909 as Pacific Coast sales manager with headquarters in San Francisco. He continued in this capacity until 1918, when he was transferred to St. Louis as sales manager of the American Car Company, which had become a Brill subsidiary in 1904.

F. A. Richards

As vice-president and sales manager Mr. Richards will continue, just as he has in the past, to devote his attention to the problems of the industry in that part of the country where he is so well known.

A native of Ohio, Mr. Richards was educated at the Uniontown High School, from which he was graduated in 1893, and at Mount Union College, Alliance. It may well be said that he has devoted his entire business life to the electric railway and affiliated manufacturing industries. His success is attested by his recent promotion.

Ernest Hatton has resigned as general manager and engineer of Newcastle-on-Tyne Corporation Tramways, owing to ill health. The municipality received the news with great regret. Mr. Hatton has held the post since 1905. During that period he has been responsible for carrying out important developments of the system. Before he went to Newcastle he occupied a similar position at Salford and was in

charge of the work of electrifying the horse tramways there. Under his charge the Newcastle tramways have shown highly satisfactory financial results.

C. R. Harte A.E.R.E.A. Head

Impressive Career of Connecticut Company Engineer Dates Back to 1893 —Active in Association Work

Charles Rufus Harte, who has succeeded Roy C. Cram as president of the American Electric Railway Engineering Association, has been connected with the New York, New Haven & Hartford Railroad and the Connecticut Company continuously since 1893 except for a short period during 1901-04. All his life Mr. Harte has been active on the firing line. He has gone from one big construction job to another until one marvels at the capacity of the man to carry on uninterruptedly for so many years. He was really drafted into electric railway work as a result of the New York, New Haven & Hartford taking over the trolley lines in Massachusetts and Connecticut, and he had foisted upon him engineering and other problems which he himself readily admits he could not have solved had it not been for the co-operation of the officers of the company, notably Messrs. Storrs and Punderford, and his immediate associates.

It would, indeed, be interesting to recount each of the man's achievements, but it is impossible to do more than to indicate them by giving the facts with respect to the various positions he has held. As the bare biographical data are disclosed the background will unfold itself not only to the engineer but to the non-technician. The degree of appreciation of the work of the man will vary between the two sets of readers, but each of them will finish with a keener realization of the abilities of the new president than he had before.

Mr. Harte was graduated from Columbia University School of Mines with the degree of civil engineer in 1893. He at once entered the construction department of the New York, New Haven & Hartford Railroad, being employed from 1893 to 1901 in positions of steadily increasing responsibility on the four-tracking and elimination of grade crossings between New Haven and the Housatonic River; on the elevation of the Providence Division and the new four-track connection, including the Back Bay station from Dartmouth Street to the South Station, Boston, and on the double-tracking of the Naugatuck Division from Derby to Naugatuck.

In 1901 he accepted a position with Stone & Webster. For them he put under construction the 33-mile urban and interurban electric railway at Sydney, N. S., extending into the adjacent mining settlements and to Glace Bay. This work included the construction of a power house and carhouse. For the same firm he supervised work on the heavy interurban extension from Terre Haute to Clinton, Ind.

He returned to the New Haven in 1904 and was placed in charge of the extensive improvements at New Haven. He developed the plans and started this work, but in 1906 he was placed in charge of the immense trolley construction program of the New Haven. In the four years that followed he supervised work on more than 100 miles of interurban type of trolley, the electrification of 50 miles of steam railroad track and the construction of more than 150 miles of transmission lines, together with power houses and substations, carhouses and miscellaneous structures. One of the carhouses included in this program of expansion was that at James Street, New Haven, with a capacity of 400 45-ft. cars. So far as is known, this was the largest single carhouse built up to that time.

In 1910, with the establishment of the

C. R. Harte

Connecticut Company as the trolley holding and operating subsidiary of the New Haven Railroad, Mr. Harte was transferred to it with the title of construction engineer, a position he has since held. Not long thereafter opposition began to develop to the New Haven's policy of developing the electric railway system to feed the steam road. When this opposition culminated in the separation decree of 1914, the construction program was correspondingly cut down, and the work of his department has been largely directed toward valuation, real estate and tax matters. Under the department, however, there was designed and built, among other things, the New Haven bus garage, one of the most up-to-date and best equipped electric railway garages.

Meanwhile the lack of any specification for overhead construction led to an immediate study by Mr. Harte along this line and the development of specifications which are the basis of the present A.E.R.E.A. standards, a result due very largely to the fact that manufacturers of material and contractors for its erection were invited to assist in the preparation of the code and did so.

Reverting to Mr. Harte's association affiliations he has been an active member of the A.E.R.E.A. since 1910, in which year he was a member of the committee on power distribution. Later he served two years as its chairman. He has been president and sponsor of the A.E.R.E.A. committee on heavy electric traction, joint sponsor of the engineering-accounting committee of that association and chairman of the standards committee of that association. He is senior electric railway representative on the American Engineering standards committee, American inductive co-ordination committee and the committee on revision of the national electrical safety code. He is vice-chairman of the A.E.S.C. and chairman of the rules committee of the A.E.S.C. He is electric railway vice-chairman of the American induction co-ordination committee. In addition he is a member of the A.E.R.E.A., American Society of Civil Engineers and an associate member of the A.I.E.E. Particularly in his work for the American Electric Railway Association Mr. Harte has striven to bring about the acceptance of standard practices. One of the things that he proposes to do in his new office is actively to promote the wider general application of the standards that have been evolved.

Journal Staff Expanded

Both the business and editorial staffs of ELECTRIC RAILWAY JOURNAL are strengthened by changes in the organization of the transportation unit, which comprises the JOURNAL and *Bus Transportation.*

L. F. Stoll, who has been sales manager of the engineering group of McGraw-Hill papers, comprising *Engineering News-Record, Coal Age, Chemical and Metallurgical Engineering* and *Engineering and Mining Journal-Press,* has been transferred to take executive charge of the transportation unit with the title of assistant vice-president.

Charles Gordon has been relieved of other duties in order to take direct charge of the editorial staff of ELECTRIC RAILWAY JOURNAL, with the title of editor. Morris Buck will continue as managing editor.

David Cameron, formerly sales manager of the two transportation papers, has been made a member of the advertising counselors' staff of the company.

T. F. Mueller is transferred from field work in the Detroit territory to the position of assistant sales manager in New York.

R. A. Feldon has joined the business staff as advertising representative in the Detroit territory.

These changes are part of a broad program for expanding the JOURNAL'S service to its industry.

C. D. Foltz Westinghouse Representative in Chicago

C. D. Foltz, representative of the Westinghouse Air Brake Company in charge of the Denver and Salt Lake City offices, has been appointed assistant western manager of the company, with headquarters at Chicago.

When only fifteen years old Mr. Foltz entered railroad work as a telegraph operator on the Wabash. In 1910 he became an inspector for the Westinghouse company in Salt Lake City and was afterward promoted to mechanical expert and representative at that office. In this position his field of activity was widened by the inclusion of the Denver office. His headquarters were moved from Salt Lake City to Denver during the year 1923.

Tom Elliott Talks on the Electric Railway Outlook

Vice-President and General Manager of the Cincinnati Car Company Places Responsibility for the Future on Both Manufacturers and Operators—Holds Unlimited Power Available to Be Chief Cause of Heavy Equipment

AN INTERVIEW

By Charles Gordon

THOMAS ELLIOTT, vice-president and general manager of the Cincinnati Car Company, stands today with a background of experience that rivals fiction in its romance and typifies the rugged road over which many of the outstanding figures in the industry have traveled. Though entitled to rank as a veteran, he has retained a freshness of viewpoint and an enthusiasm that belie the marks which pioneering years have left.

His accomplishments as a car builder are too well known to require repetition. He has been a courageous advocate of light-weight construction and has consistently sought improved designs to give strength without excessive weight. Some of the outstanding installations of light-weight equipment that have made enviable records in reduced operating and maintenance costs have been the products of his enterprise.

I had frequently discussed the subject of car development with Elliott, but not for publication. Now that he had consented to an interview, I sought to sound the keynote of his thinking on structural design. My first question was fortunate in the sense of the response it provoked.

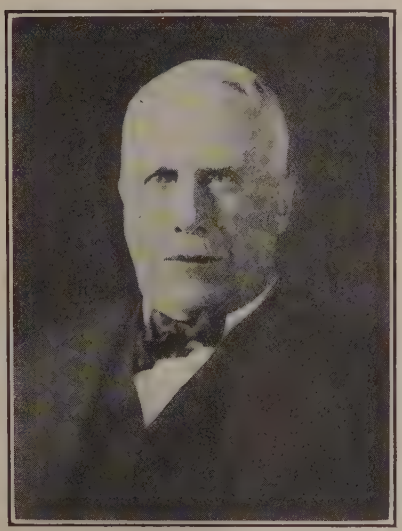
"What has constituted the greatest limitation to car construction development?" I asked.

"Lack of necessity and incentive," was the prompt reply. "There has been available with electric power an almost unlimited source of energy. Cars have consequently been merely assembled rather than scientifically designed. Excessive weight and high operating cost have been the result.

"As a mechanical and economic proposition," he continued, "transportation of people by rail is cheaper than on the highway, except when traffic is so extremely light that the investment in track is not justified. In view of the development of automotive vehicles and the rapid improvement of the bus, the time is getting short for railways to bring their properties up to date and for manufacturers to save their businesses by further improvement of their products. The opportunity will not continue indefinitely. Electric railways must be brought up to the modern idea of good transportation service."

This was, indeed, a frank statement on conditions in the industry. But Tom did not stop there. I had broached a subject in which he was keenly interested, and before I could put my next question he took me back a jump.

"Take the bicycle," he said. "In its day it was the finest designed and built transportation machine of which we have an example. It was largely instrumental in introducing the development of anti-friction bearings. Early bicycles weighed 175 lb. In their final form they were developed to the point where a 17-lb. vehicle carried a 200-lb. man with ease. This development took place when high grade material was scarce, but dependence on human motive power forced progress, because the bicycle which was easiest to propel was easiest to sell."



Thomas Elliott

Thus we traveled back in mind to a period beyond the advent of the automotive vehicle to the beginning of modern individual transportation machines. It is a habit Tom Elliott has of drawing illustrations for the analysis of modern problems from a sometimes forgotten experience of the past.

THIS is the second of a series of interviews with the heads of car building plants and other prominent manufacturers. Rapidly growing interest in the improvement of electric railway equipment throughout the industry makes the views of these manufacturers particularly significant at this time. An interview with Samuel M. Curwen, president of the Brill Corporation, was published last week.

But despite this practice of drawing on past experience, he would not tell me his age. Nor would he allow me to guess it except on condition that I first matched my skill against his on fairway and green. But I knew his hobby and something about his score. Consequently I decided to omit his age. I can, however, record that he was born on a farm in the north of England. He landed his first job in the United States with the Hazzard Manufacturing Company at Wilkes-Barre, Pa. This company manufactured wire rope and cable. In those days wire rope for the propulsion of cable cars was coiled in continuous lengths on several flat cars for shipment. It was in one of these gangs that Elliott, with much ambition and little experience, entered what in an indirect way was a part of the transportation business.

For several years following he was employed in the shops of the Lehigh Valley Railroad. About 1888 he went to Tennessee to run a mine locomotive. He was delighted with the job, but it lasted only a week. His natural curiosity to know all about any piece of machinery with which he comes in contact led him to examine the inside of the boiler, and the next day he decided to look for work with a more attractive future.

Following this his experience was varied. He worked in a roundhouse at night. Then he took a job with the Knoxville Car Wheel Company. Later, a brief experience in dredge boat construction was brought to a sudden end by a flood which occurred on the Tennessee River.

As I proceeded to marshal my questions to draw out expressions of opinion, my mind reverted frequently to those early days of the Tom Elliott who now sat before me, still mentally objecting to the procedure of an interview for publication. But my interest lay largely with the future. I wanted his views on current tendencies and trends. So I asked about the status of the interurban roads of the country, which some people have claimed are headed for the scrap pile.

"There is no question but that they fill a fundamental need," he said. "Except in those instances where the lines were unjustified in the first place and should never have been built, they can be put on a profitable basis."

"Does properly designed light-weight equipment afford ample safety and comfort for average interurban condi-

tions," I persisted, wishing to draw him out further on this topic.

Apparently my question was well directed and touched on a subject to which he had given much careful thought. Tom leaned across the corner of his desk, and though he spoke deliberately, as is his custom, he raised his voice slightly and answered without mincing words.

"One of the reasons for the heavy cars operated on some interurban lines is the fear and dread of assuming the responsibility of our own convictions that is inherent in all of us. This has resulted many times in blind adherence to weight, not because it has been proved that heavy cars are safer in a collision or derailment, but rather because this has generally been considered as justification for relief from responsibility."

I was impressed by this answer. Here was the basis on which Tom Elliott has built many light cars for interurban service—some for operation at speeds up to 60 m.p.h. I began to probe deeper for some of the earlier experiences and associations that lay behind this courageous statement.

Won to Electric Traction

It was while working as master mechanic and chief engineer of a cotton mill in Knoxville that Elliott began to hear about strange experiments on electric cars in Scranton. He listened at that time with a mixture of skepticism and interest. It may have been his early association with local transportation in the cable coiling days, or merely that strange fascination which the romance of transportation weaves, but in any event Tom continued to follow the news of these experiments.

W. G. McAdoo, later Secretary of the Treasury in Woodrow Wilson's Cabinet, bought the horse car lines in Knoxville and began to electrify them. Elliott watched with particular interest the construction of the power house. When the first car was finally operated under the new power in the streets of Knoxville he was convinced that he wanted to be a part of this new industry. M. R. McAdoo, brother of the owner, was the manager of the railway. Tom hunted him up and landed a job running the power plant.

That did not keep him busy long. With characteristic thoroughness he soon had leaky steam pipes tight and commutators bright. The job of welding an oil can looked like only a side line to one with as many ideas as Elliott. He bought a lathe and set it up in the engine room. Later he fixed up a brass furnace in one corner and started casting and finishing trolley wheels. Soon he began to rewind motor armatures in the power house. Ultimately, all of the car repair work was turned over to him.

In 1891 Elliott went to Atlanta with McAdoo. Here, two years later, he used what were then, so far as he knew, the first solid gears applied to car axles without keys. Some time later he began to build cars in the Atlanta shop. On the first of these the width of the customary side sill plate was increased from 6 in. to 18 in. In 1896 this plate construction was extended to the belt rail to form the continuous side girder type of construction that is even now so generally used. The idea came from watching a repair man who used a wide plate to cover a gash in the side of a car.

During this early car building experience Elliott began to favor the use of steel as a material for increasing strength and reducing weight in cars. On the interurban line operated at that time by the Atlanta company the single-truck cars had proved unsatisfactory from the standpoint of riding qualities and ability to stay on the track at satisfactory speed. Tom built some double-truck cars. As cars go today, they were heavy. They had four 50-hp. motors each, but their excessive weight made it impossible to run them to the end of the line due to the limited distribution copper available. "Here," Tom says, "was born a high regard for the importance of weight reduction in cars."

Having again thus built up the background, I swung once more to present-day conditions.

"Is there any difficulty in financing purchases of new cars where a railway is otherwise limited in its ability to sell its securities?"

"There is no difficulty. Proper financing arrangements for cars can be readily consummated."

Still I was not satisfied.

"Do you have any difficulty in disposing of electric railway equipment trust paper?"

"None whatever."

There were no qualifications in these answers; thus encouraged, I put my next question.

"In your opinion, does demand for individuality or inertia on the part of railway managements stand in the way of car development?"

Railways After Improvements

"My experience has been that railway managements are eager for new developments and that they will take any good scheme—and half of the bad ones—suggested by a car builder. They are looking for improvement and are willing to assume a large part of the trouble and expense of experimenting with new developments. The railways are hungry for new ideas."

Thus Tom Elliott proceeded to explode any assumption that operators are not interested in new developments advanced by the manufacturers. He had told me before this of his experience back in the days when the mechanical men in operating companies frequently worked with the crudest of facilities. Consequently, to me, his optimistic outlook on the demand for development was refreshing.

There are interesting anecdotes of Tom's early experiences as a master mechanic in Atlanta. When he first went to work there he found that the master mechanic was provided with a stable, several horses and a negro driver. Elliott had little use for these trappings of Southern luxury. He decided that the stable would make a good foundry. Acting on this idea, he succeeded in buying an old cupola for $35, incidentally including in the bargain a three-chime steamboat whistle, worth at that time about $200. He used trainmen apprentices who were sent to the shop for instruction to move his cupola and set it up. When the general manager discovered the character of training his new platform men were receiving Tom lost a fine source of cheap labor. He finally rigged up the cupola with an old railway motor and a good housing for a blower and began to make chilled iron wheels that had a life varying from three weeks to five years. Sand for molds was dug in a lot near the foundry.

Elliott left Atlanta in 1901 with M. R. McAdoo and went to the West Penn Railway, first as superintendent of motive power and later as manager. In 1903 he accepted a position with the Cincinnati Traction Company, some two years after W. Kesley Schoepf had taken charge of the property as president. Tom was chief engineer in charge of car maintenance, overhead line and power stations.

A short time before the Cincinnati company had started building cars in its new shops, a plant much larger than was needed for maintenance work alone. Tom became engaged in many outside jobs for his superiors, in addition to his regular duties. He was frequently brought into contact with the car building plant. Finally he was delegated to find a man to take charge of car building. After ten days, without success, he was called into the office and given the job himself. As a result he began devoting his entire attention to the car plant.

Co-operation Needed by Buyer and Builder

I asked Elliott whether, in his opinion, operating railways are justified in building their own cars under present conditions. There are several interesting thoughts in his reply.

"This depends entirely upon whether they can build a better car than they can buy. It is apparent that an operating management never makes its reputation by car building. Its primary job is to give good transportation service. When it engages in the work of building cars it diverts the attention of much of its personnel from operation and maintenance to manufacturing. Proper co-operation between operating companies and the car builders will result in better equipment than either can produce alone. Car builders are more familiar with the engineering features of design. Operators have the necessary experience to suggest improvements that make equipment popular with passengers and low in operating and maintenance cost.

"One primary disadvantage in a railway company building its own equipment," he continuel, "is that it does not get the benefit of the constructive criticism of other operators that is freely made to car builders."

Here seemed to be good thinking, unbiased by commercial expediency. It suggested another question.

"What, in your opinion, is the life of electric railway cars?"

"With proper maintenance, their life is indefinite. Retirement will take place due to factors outside the cars themselves. These include more suitable dimensions and operating and maintenance economies made possible by improvements in design, to say nothing

of increased attractiveness of new equipment resulting from development of the art. These factors, rather than the actual wearing out of the cars themselves, will dictate replacements."

Tom had shown throughout our discussion a definite tendency to place on the shoulders of the manufacturers themselves a large part of the responsibility for the future progress of the industry. As we came to the final question on the outlook for car building business in 1926, he maintained this position by summarizing his viewpoint in these words:

"There is now an active demand for new and improved types of cars. The extent of the business that will be placed during the year 1926 is largely dependent upon the efforts exerted by car builders to develop and sell their products."

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Bids Asked for 300 Cars and 150 Buses at Detroit

Awards impend at Detroit for more than $4,000,000 of car and bus equipment. H. U. Wallace, general manager of the Department of Street Railways at Detroit, Mich., has emphasized to the Board of Street Railway Commissioners the urgent need of the department for additional equipment. In a letter to the board on Feb. 22 Mr. Wallace said that every unit owned by the Department is now in constant service and in addition the department is renting 50 additional motor cars and trailers from the Detroit United Railway in an effort to meet the heavily increased demand for service. In spite of these efforts, however, the service falls short of adequately filling the demands. According to Mr. Wallace, at the present time the city system needs at least 100 additional cars.

He says that approximately 150 of the cars now operating are so worn out and obsolete that their operation represents a current liability in the form of excessive maintenance and upkeep costs. These cars should be scrapped immediately and replaced. Furthermore, the department will need an additional 150 street cars or large buses to meet the future demands of next fall and take care of the rapid population and territorial growth of the year.

Mr. Wallace says that in considering the motor coach problems it is apparent that the city system will need 75 additional large buses to handle present business satisfactorily and on a conservative estimate will require 50 more buses to establish additional routes in certain sections of the city which are urgently in need of transportation facilities.

In consequence he has recommended that the city advertise for prices and terms on the following equipment: 300 new street cars, with six months option on 150 additional cars; 150 new large double-deck buses, with six months option on additional buses.

Mr. Wallace says:

> As soon as we get these bids we will be able to determine what kind of terms we can get on the purchase of this equipment, and after obtaining the terms we can then definitely decide on the amount of equipment to purchase at this time.
>
> From various conferences that we have had with bus manufacturers and car manufacturers we have been led to believe that we will be able to procure equipment on terms that will permit of our paying for all of this equipment either out of the earnings from the equipment or out of the saving that we can make in the cost of operating new, light, modern cars in place of our present heavy and obsolete units.

The board has approved the request made by Mr. Wallace and the Department of Street Railways advertised on Feb. 24 for bids for the equipment mentioned by the railway manager in his letter. The awarding of the contracts is of course subject to approval by the City Council.

Brill Report Misquoted

In the digest of the report of the J. G. Brill Company published in the ELECTRIC RAILWAY JOURNAL for Feb. 13, page 307, the item of cost of operation was misstated due to the transposition of the figure of $560,938. The paragraph in which this figure appeared as contained in the report and as it should have been presented in the JOURNAL read:

> After deducting from earnings all cost of operations, including maintenance and repairs and depreciation for the year amounting to $560,938 and after setting aside out of earnings reserve for federal income taxes, not yet due, of $82,791, the result of the operations of all the plants of your company shows a net profit for the year of $571,269.

Ohmer Company Is Active

With its factories working day and night in an effort to keep the total of unfilled orders to a minimum, the Ohmer Fare Register Company, Dayton, Ohio, reports the volume of sales for the month of January to be considerably greater than any previous month in its history. More employees are engaged at the present time than has been the case since the close of the war. As compared with this time last year, there is an increase of 30 per cent in the number of men employed.

January was also the biggest month for export business in the history of the company, it was reported. Many large orders were received from Australia, New Zealand, South and Central America, England and Canada. The new types of ticket-printing fare registers for electric and steam railroad companies and motor bus lines, which were recently announced, are attracting attention from transportation officials throughout the world, and are being manufactured in increasingly largely numbers. It is anticipated that 1926 will prove a record year for the Ohmer Company.

Prize for Industrial Advertising Urged by Harvard Award

Recommendation for the establishment of an award for the best advertising campaign of industrial products was made on Feb. 22 by the jury of awards of the Harvard Advertising Awards, founded by Edward W. Bok. At the same time the names of the winners of awards already established in 1925 were announced by Wallace B. Donham, dean of the Harvard Business School. The annual award consists of cash prizes totaling $11,000 and a gold medal. The latter was awarded to Ernest E. Calkins, president of Calkins & Holden, Inc., New York advertising agency, for distinguished personal service to advertising.

Cash awards cover various phases of the advertising field, such as the national campaign most excellent in planning and execution; the most excellent local campaign of a manufacturer; research and development of an index of effective buying power for consumers by counties in the United States; distinguished individual advertisements, etc. It is significant that the jury of awards felt it advisable to recommend an additional award to stimulate excellence in industrial advertising.

The adoption of this recommendation would naturally mean a reapportionment of awards in existence at the present time.

Pennsylvania Orders Electric Passenger Locomotives

Contracts on all the motive machinery, controls and other electrical equipment for six large electric passenger locomotives and two double-cab switching locomotives have been awarded by the Pennsylvania Railroad to the Westinghouse Electric & Manufacturing Company. This equipment will be shipped to the Juniata shops of the Pennsylvania Railroad at Altoona, where the entire group of eight locomotives is to be built.

The six passenger locomotives, which have a continuous rating of 3,730 hp. each, and compare as regards both tractive effort and speed with the greatest steam locomotives in existence, will be put into operation in the New York division hauling heavy passenger trains between the Pennsylvania Terminal, in New York City, and Manhattan Transfer. These locomotives are in addition to two others of a similar type placed in service at Manhattan Transfer in 1924.

Design of the new equipment was handled by the engineering staff of the motive power department, Pennsylvania Railroad, under the personal direction of its chief, J. T. Wallis. The passenger units have a 2—8—2 wheel arrangement with a so-called "steeple" type cab construction. Motors are arranged two per jack shaft, and are mounted outside, and at either end, of

the driving wheelbase. Each jack shaft serves two pairs of drivers, the latter of which are 80 in. in diameter, or approximately 1 ft. higher than the average man. The connection between the motors and the jack shaft is by means of pinions and flexible gears. The gear ratio of the locomotives will permit a sustained speed of 70 m.p.h. When delivered and ready for service each locomotive will weigh approximately 400,000 lb., with a total length of 68 ft.

The two electric switching locomotives are of the so-called double-cab type for general yard work, of which quite a number already have been designed and ordered.

Purchase of Enormous Copper Smelter Announced

Hyman-Michaels Company, Chicago, Ill., announces the purchase through the United Commercial Company, San Francisco, of one of the largest copper smelters in the world. The purchase covers the Mammoth, Keystone and Kennett properties of the United States Smelting, Refining & Mining Company, located at Kennett, Cal. In addition to the plants, the purchase covers all personal properties, including a considerable amount of trackage and railroad equipment.

Pressed Steel Car Company Merges with Subsidiary

Stockholders of the Pressed Steel Car Company have approved the plan recently submitted by directors whereby a merger with Western Steel Car & Foundry, a subsidiary, will be effected and the company recapitalized. The name Pressed Steel Car will be continued. When the plan is consummated Pressed Steel Car Company will have an authorized capital of $16,200,000, par value, cumulative 7 per cent preferred and $46,300,000, par value, common stock, with outstanding issues of $15,000,000 preferred and $12,500,000 common.

Rolling Stock

Memphis Street Railway, Memphis, Tenn., has placed an order with the St. Louis Car Company, St. Louis, Mo., for 32 single-end cars, 46 ft. long.

Roanoke Railway & Electric Company, Roanoke, Va., an American Electric Power Company property, has ordered from the J. G. Brill Company six 28-ft. closed motor cars equipped with Brill 77-E trucks.

Tampa Electric Company, Tampa, Fla., has included in its 1926 budget the purchase of 25 double-truck cars. This item of the expansion program alone represents an expenditure in excess of $300,000.

Worcester Consolidated Street Railway, Worcester, Mass., needs 77 new cars, according to a recent survey made there, to bring the rolling stock equipment up to present-day requirements. The proposal now made is for the use of light-weight one-man, two-man cars. Reference is made elsewhere in this issue to the survey under which this fact and others with respect to service and equipment in Worcester were brought out.

Chileña de Electricidad, Santiago, Chile, has ordered from the Brill Company 30 28-ft. 3-in. closed car bodies to be equipped with Brill 177-E trucks.

Georgia Railway & Power Company, Atlanta, Ga., ordered in January of this year ten new one-man cars for its interurban line. The specifications of these cars follow:

Builder of car body	Cincinnati Car Company
Type of car	Single-end, double-truck interurban safety car for two-car train service
Seating capacity	51
Weights:	
Car body	18,000 lb.
Trucks	9,880 lb.
Equipment	8,365 lb.
Total	36,245 lb.
Bolster centers, length	26 ft. 3 in.
Length over all	45 ft. 6 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 4 in.
Height, rail to trolley base	11 ft. 8 in.
Body	All steel
Interior trim	Light mahogany
Headlining	Agasote
Roof	Arch
Air brakes	Safety Car Devices
Armature bearings	Sleeve General Electric
Axles	Brill Company Cambria hammered steel
Bumpers	Pressed steel
Car signal system	Faraday
Car trimmings	Bronze oxidized, Dayton
Center and side bearings	Brill, center bearings; Stucki, side bearings
Compressors	Western Traction Brake Company DH-16
Control	General Electric PC 5-K2
Couplers	Tomlinson, Form 10, car, air and electric
Curtain fixtures	Curtain Supply No. 90, pinch fixture, Rex rollers
Curtain material	Pantasote, grain Morocco, color No. 86
Destination signs	Keystone JRR and ILR
Door-operating mechanism	National Pneumatic
Energy-saving device	Economy meter
Fenders	H-B wheelguards
Gears and pinions	General Electric A-1
Hand brakes	Peacock staffless
Heater equipment	Unsettled
Headlights	Ohio Brass SDH roof type
Journal boxes	Brill
Lightning arresters	General Electric Aluminum A-11
Motors	Four GE-265-A, inside hung
Registers	Ohmer
Sanders	Ohio Brass, Form 2
Sash fixtures	Dayton wedge type
Seats	Hale & Kilburn 900A bucket type
Seating material	Genuine gray leather
Slack adjuster	American automatic
Springs	Brill Company
Step treads	Aluminum, Cincinnati Car
Trolley retrievers	Knutson 5-B
Trolley base	Ohio Brass, Form 4
Trolley wheels	Nuttall 6 in. diameter
Trucks	Brill 177-E-1
Ventilators	Nichols-Lintern Company type C
Wheels	26 in. steel E-26-S
Special devices	Signal lights; push-button control of doors, variable load brake, compensating fixture dome lights

Metal, Coal and Material Prices

Metals—New York	Feb. 23, 1926
Copper, electrolytic, cents per lb	14.25
Copper, wire base, cents per lb	16.00
Lead, cents per lb	9.10
Zinc, cents per lb	8.07
Tin, Straits, cents per lb	64.75
Bituminous Coal, f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.875
Somerset mine run, Boston, net tons	2.10
Pittsburgh mine run, Pittsburgh, net tons	2.05
Franklin, Ill., screenings, Chicago, net tons	1.575
Central, Ill., screenings, Chicago, net tons	1.125
Kansas screenings, Kansas City, net tons	2.425
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft	$6.25
Weatherproof wire base, N.Y., cents per lb.	17.75
Cement, Chicago, net prices, without bags	2.10
Linseed oil (5-bbl. lots), N.Y., cents per lb.	11.60
White lead in oil (100-lb. keg), N. Y., cents per lb	15.50
Turpentine (bbl. lots), N. Y., per gal.	$0.98

Trade Notes

Kelly, Cooke & Company, Philadelphia, Pa., have announced a change in location for their headquarters. Formerly located at 424 Chestnut Street, they have now taken offices in the Insurance Company of North America Building, the Parkway at Sixteenth Street.

Leon L. Wolf, president of the Leon L. Wolf Waterproof Fabric Company, Cincinnati, Ohio, has announced the appointment of Edwin Besuden to be sales promotion manager. Mr. Besuden formerly was connected with the Jewett Motor Car Company. He is well known among electric railway men. He will spend most of his time in the field, further stimulating the widening market for Wolf Kemi-suede, the new waterproof material for upholstery purposes in the automotive and electric railway fields.

Farley Osgood, for many years prominently identified with the electric light and power industry, has established consulting engineering offices in the National Bank of Commerce Building, New York. He will engage more particularly in the design, construction, operation and interconnection of public utilities. Mr. Osgood has been especially active in the affairs of the American Institute of Electrical Engineers and was signally honored with the presidency in 1924-1925. He is widely known as a remarkably able engineer.

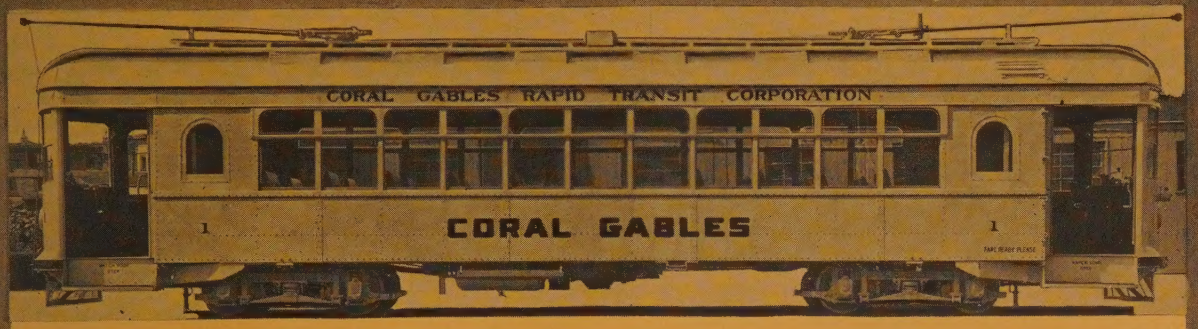
Reo Motor Car Company, Lansing, Mich., states that, exclusive of administrative expenses, a fleet of six Reo 21-passenger six-cylinder model W buses has been operated in South Bend, Ind., at a cost of only 8⅓ cents per bus-mile by the Chicago, South Bend & Northern Indiana Railway. Information as to operating costs was obtained from a statement recently made by George R. Green, general superintendent of the railroad. The fleet has been in operation since February, 1925.

New Advertising Literature

Electric Controller & Manufacturing Company, Cleveland, Ohio, has issued a leaflet which illustrates various applications for E, C & M separator magnets. Installation methods are also treated. Copies will gladly be supplied on request.

Metallo Gasket Company, New Brunswick, N. J., has issued catalog No. 26, entitled "Metallo Gaskets." In this are described various types of gaskets for use in pipe joints, air pumps, boilers, hand hose, and wherever else this equipment may be required. Gaskets for high and low pressure work and for ordinary and extreme conditions are available.

Korfund Company, Inc., New York, N. Y., has issued a bulletin entitled "How to Isolate Machine Vibrations." This points out the disadvantages of attempting to operate machinery without adequate protection from size and vibration, and states that Korfund plates of coarse natural cork are admirably adapted to meet these problems.

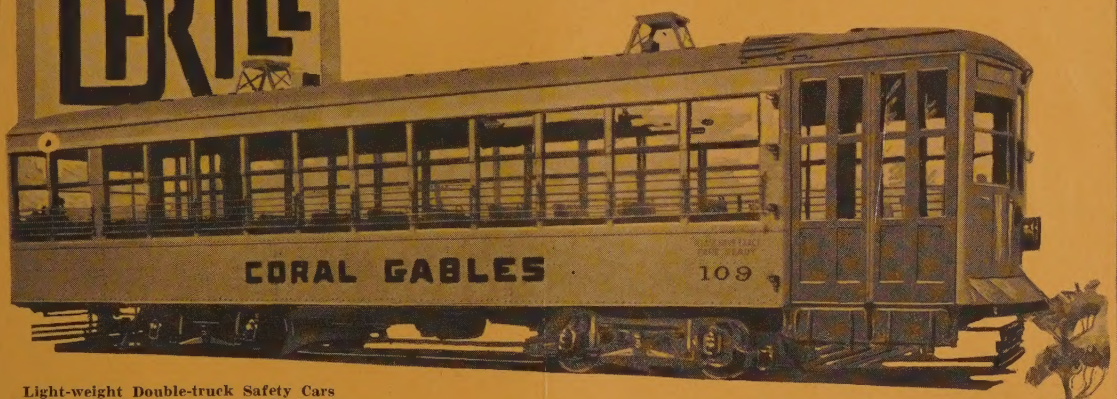


Brill "DeLuxe" Rapid Transit Type Car

MODERN CARS
Win in Coral Gables

Coral Gables quickly recognized the importance of modern electric railway car service to community development.

BRILL



Light-weight Double-truck Safety Cars
Built by the American Car Co., St. Louis

Birney Safety Cars
Built by Brill

Bus equipment that's familiar —it's electric

Railway mechanics and electrical equipment men prefer to care for gas-electric buses. They are familiar with the electrical equipment; they have a means of testing the engine—which is possible only with

Gas-Electric Drive

(for buses and trucks)

Consult the General Electric Company before you buy buses to be sure proper electrical equipment is applied. Best results are obtained only when service and grade conditions have been considered.

THE operation of buses naturally presents certain new problems to the railway operator. Therein lies a distinct advantage which the gas-electric bus offers to electric railways.

Gas-Electric Drive eliminates many of the difficulties of maintenance, which the ordinary gas bus may present. There is no clutch to care for. No gear experts are needed because there are no transmission gears. The "rear end" problem is gone, because there is no differential, rear wheels being driven by standard direct-current electric motors.

The familiar tests and usual methods of maintenance are applicable to Gas-Electric bus drive, because it consists simply of generator, motors and control.

Maintenance Advantages

Inspection and testing of engine are simplified, made systematic and conclusive.
Engine cannot be raced or stalled and average engine speed is lower—prolonging life of bearings, pistons, cams and all other moving parts.
Clutch, gears and differential—all subject to high maintenance—are eliminated.
Without the shock of gear changing, the life of engine, chassis and body is longer.
Uniform torque of electric drive means less tire wear.
Engine lubrication is materially less.

Operating Advantages

Greater riding comfort—no vibration or jerks during starting, and smooth acceleration.

Increased safety—control entirely in foot pedal relieves operator's hands for steering—skidding is minimized by individual drive on rear wheels—engine cannot stall on dangerous crossings.

Higher scnedule speeds—through more rapid acceleration and reduction of driver fatigue—affording lower costs and higher receipts.

11-25C

GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY, SCHENECTADY, NEW YORK SALES OFFICES IN ALL LARGE CITIES